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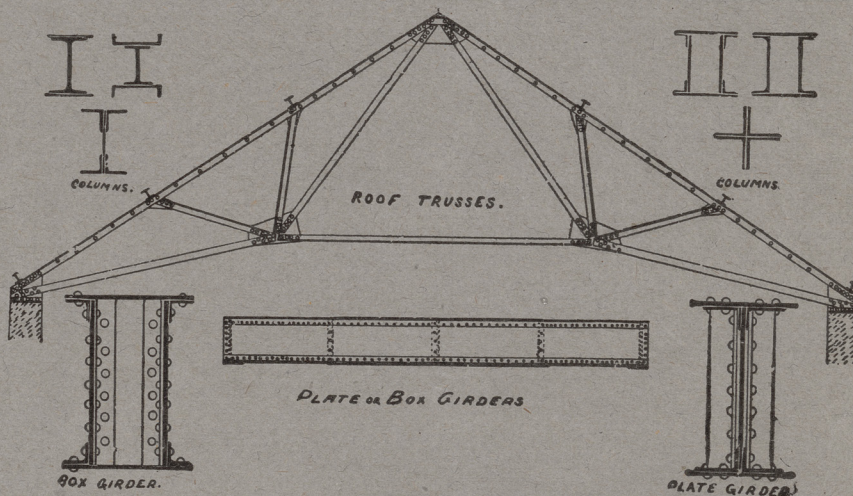
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MR. T. G. JACKSON'S LETTER ON THE DANGER OF USING IRON IN BUILDINGS.

To the Editor of the Times:

Sir—The accident which has brought part of Charing Cross Station to ruin and has cost so many lives, and which one fears must be symptomatic of further decay and danger to the rest of the fabric, brings home to an architect's mind very forcibly the suspicion that iron construction is still on its trial, and that we do not know what its ultimate fate will be.

The constitution of iron, robust enough in most respects, is delicate in others. Damp, which will not injure brick or stone, and will only destroy slowly the harder kinds of timber, will bring iron to speedy ruin. The life of an iron structure exposed to the weather depends absolutely and solely on the thin skin of paint we put upon it, which is constantly perishing and must be constantly renewed. Thirty years, one has heard it said, is the lifetime of a girder. There are, however, many parts of ironwork when once it is put together which a paint brush will not reach, but to which water will penetrate, rusting the metal eating into the joints and loosening the rivets. And ironwork is so bound together, and every part depends so much on its attachment to another, the whole structure consisting of a system of ties and braces, mutually straining and strained by one another, that a fracture of one member may upset the whole construction. We are told that it was the breaking of a tie-rod that brought the roof at Charing Cross to ruin, and this is a quite conceivable explanation of the disaster.

Iron construction, it may safely be maintained, is still on its trial, and what has just happened may be—*absit omen*—the precursor of similar catastrophes. In many respects we are only in the experimental stage. No one can say for certain what the action of cement is on ironwork embedded in it. One used to hear that a coating of cement concrete made steel imperishable. One hears now many rumors to the contrary. Cast

iron, at first adopted for railway bridges, has had to be replaced by wrought iron, because it was found that constant vibration destroyed the tenacity of cast metal. Who can say how long it will be before it will do the same for wrought?

But the danger is not confined to great railway structures. It must be remembered that the house fronts of miles and miles of London streets are entirely carried on iron girders, and that these girders are inaccessible, and can never be repainted, and that the name boards and other facings that conceal them are not designed to be proof against the damps and fogs of London, to the ravages of which the iron girder is as susceptible as the human lung. The mere condensation that takes place on cold metal at changes of temperature in the weather outside is enough to do the mischief, and as the mischief is covered up from sight its progress can not be detected.

When one looks at the huge structures in the Brompton road and elsewhere that seem to the eye to stand on the edge of sheets of plate glass, one not only grieves over the artistic defects of such a system of construction, but can not help feeling considerable apprehension on other grounds.

It is reported that an engineer has prophesied that no one will use iron or steel in his building 30 years hence. I feel sure that no architect who wishes his building to live should do so now. He will do wisely to exclude it from his work, except in such minor matters as ties and bolts and plates to stiffen timbers, or small girders to carry floors. So used, iron is a valuable servant, but it makes a very bad master.

Your obedient servant,

THOMAS G. JACKSON.

Eagle House, Wimbledon, Dec. 8.

The name of Brooks-Smith Hardware Company, of Toronto, has been changed to the Brooks-Sanford Company. The new company is composed of the three Brooks Bros. and two Sanford Bros., Mr. W. M. Smith having retired.

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there is probably more in it than this. The formation of ice is attended by a great giving out of latent heat from the water in process of freezing. This phenomenon, which is held by some to account for our Indian Summer—as being consequent upon the sudden communication of heat to our atmosphere by the first freezing of the great lakes to the north—ought to account for some of the advantage to the fruit. Not only does the ice act as a protective coating against cold, but, in its formation, there must be an actual communication of heat.

British Trade Supplement

The Publishers of "The Canadian Architect and Builder" have arranged to furnish information respecting British Exporters of Building Materials and their goods advertised in this paper, and will keep on file at their offices, Alliance Building, Montreal, Confederation Life Building, Toronto, and 720-721 Union Bank Building, Winnipeg, Catalogues, Price Lists, Etc.

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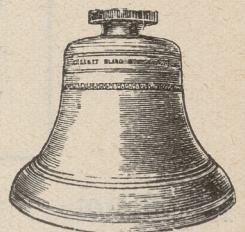
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Notwithstanding the large duty assigned to the exhaust steam at headquarters, still more might be performed, so that a project is being discussed for extending the system to two schools and a hospital about a quarter of a mile distant. A point not yet clear is whether on very cold days it might not be necessary to supplement the exhaust steam by live steam which, coming from so great a distance would be subject to decided loss in transmission.

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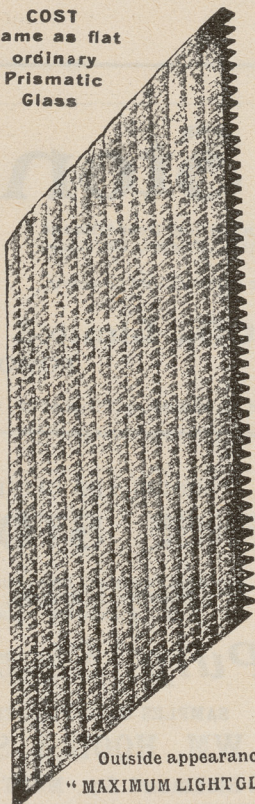
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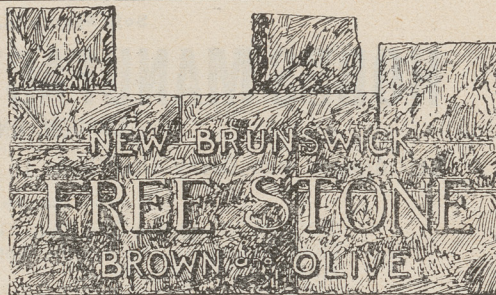
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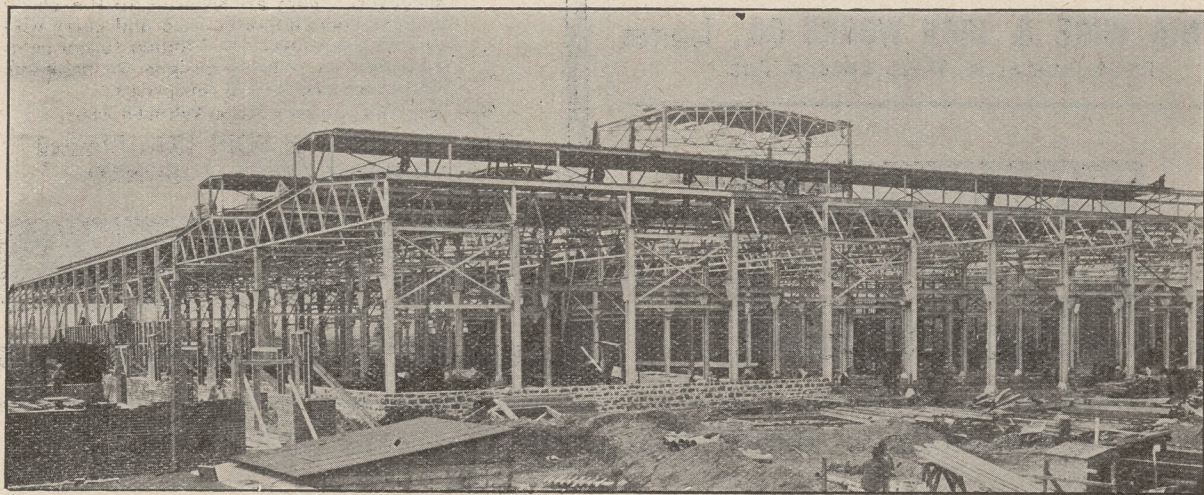
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ILLUSTRATIONS ON SHEETS.

Plan of Improvements to Toronto.
Proposed Water Front for Toronto.

ADDITIONAL ILLUSTRATIONS IN ARCHITECTS' EDITION.

Canadian Bank of Commerce Branch on Yonge Street, Toronto.—Messrs. Darling & Pearson, Architects.
Doorway on the Esplanade, Quebec.

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OUR ILLUSTRATIONS.

THE PLAN OF IMPROVEMENTS TO TORONTO AND PROPOSED WATER FRONT FOR TORONTO

are referred to elsewhere in this number, in Mr. Walker's speech at the dinner of the Ontario Association of Architects and Mr. Langton's address in presenting the plan to the Association at its Annual Meeting.

CANADIAN BANK OF COMMERCE, BRANCH ON YONGE STREET, TORONTO.—MESSRS. DARLING & PEARSON, ARCHITECTS, TORONTO.

The annual report of the Bank of Commerce stated that the handsome branches which the bank is building, not only in the cities but in the country towns, are a good investment. This is satisfactory, for the numerous branches, which not only this bank but others are building, are a great addition to the beauty of our cities and towns. Part of the satisfaction they give to the taste is without doubt due to their singleness of purpose. There is usually no visible conglomeration of ends—a bank above and offices below. And the evident testimony to the solid financial position of the corporation which this appropriation of a valuable site for a single purpose gives, adds considerably to the appearance of dignity and character which the same causes—simplicity and definiteness of purpose—give to the design.

DOORWAY ON THE ESPLANADE AT QUEBEC.

The Montreal architect who kindly sent us the photograph from which our illustration is taken, describes this doorway as being of wood placed in a simple stone front.

THE CANADIAN ARCHITECT AND BUILDER COMPETITION.

Our space, both in the text and in the illustration sheets which go with the Regular Edition, is so taken up this month that we can only announce the decision in this competition and leave the publication of plans and of the judges' report to our next issue.

The prize winners are: First, Mr. E. H. Yeigh; Second, Mr. W. B. Van Egmond, and Third, Mr. Victor G. Steer. The judges were Messrs. John Gem-

mill, C. H. Acton Bond and J. Francis Brown. We retain also, for publication, the drawings by Messrs. S. Douglas Ritchie, W. L. Somerville, and Albert Pollard.

BUILDERS' EXCHANGE DINNER.

The third annual banquet under the auspices of the Toronto Builders' Exchange took place in St. George's Hall on the evening of the 22nd inst., when there were present upwards of 250 persons, including many ladies. Mr. George Duthie, president of the Exchange, presided.

The programme was original and attractive, being in the form of a four-page note-book, the cover being of blue print paper bearing a design of a wall under construction, surmounted by a maple leaf and beaver. The menu was fashioned after the manner of a building, the first course being at the bottom of the page, with the advice, "begin at the foundation sure."

After the banquet an excellent series of songs and speeches was given. The National Anthem having been sung in response to the toast of "The King", Rev. A. L. Geggie proposed the toast of "Our Country," which was replied to by Hon. J. W. St. John. Mr. C. W. Batt proposed "Our City", to which Alderman Graham replied. "To Sister Associations", proposed by Mr. John Aldridge, Messrs. E. Burke and H. Simpson, of the Ontario Association of Architects, and G. C. Young, President of the London Builders' Exchange, responded. The latter urged the Toronto Builders' Exchange to take the initiative towards the formation of a Provincial Association. Then followed the toast of "The Ladies" and "The Press", proposed respectively by Messrs. Frank Saunders and T. Christie. Those who contributed to the musical programme were Miss Violet Apted, Mrs. Mildred M. Ritchie, Miss Lillian Landell and Messrs. J. H. Cameron, J. Robert Page and A. F. Saunders.

The following gentlemen composed the Dinner Committee: Messrs. Frank Saunders, Chairman; J. L. Phillips, Secretary; A. Dinnis, F. Holmes, H. Elgie, J. M. Gander, Isaac Price, J. B. Thomson, A. G.

Saunders, Geo. Duthie, Jas. Crang, Thos. Christie, Wm. Smallwood, Walter Davidson, Jno. Scott, J. B. Vick, H. Martin, J. R. Hoidge, Wm. Pears, Geo. Britnell, R. Stanley, T. W. Self, C. W. Ball, Jno. Aldridge, Jno. Maloney, Geo. Gander, Jno. Logan.

THE PLAN OF IMPROVEMENTS TO TORONTO.

SPEECH OF MR. BYRON E. WALKER, GENERAL MANAGER OF THE CANADIAN BANK OF COMMERCE, AT THE ANNUAL DINNER OF THE ONTARIO ASSOCIATION OF ARCHITECTS.

Mr. President and Gentlemen: I have to thank the Ontario Association of Architects for giving me the opportunity of being here to-night and of speaking on this subject; one that has certainly been very dear to my heart for many years. I shall, I suppose, have to try to say something that has not been said before regarding this plan; but this is a rather difficult task after the very thorough manner in which Mr. Langton dealt with the subject and after what has been said by the Mayor and Sir Henry Pellatt. I think we should try to consider the reasonableness of bringing this plan before the people of the city of Toronto at this particular moment. The growth of a city begins generally with the cross roads in the country, developing into village and town and city; it has usually no shape, no rationale, no reason for being, except the gregarious instinct of man, and in a new country it is apt to grow a long time before people begin to think about its rationale at all—as to why it is there and what its purposes are. As Mr. Langton said, in the middle ages cities did not have sewers or other improvements and conveniences; they were mere habitations of men crowded inside a wall. Now there is nothing very unnatural to me in the position of Toronto at the present time. It has had in the last fifteen years an extraordinarily rapid growth. If we put ourselves back to the time when it was a little place clustered about the Don, and consider that it has now reached almost to the northern reaches of the Humber, we shall realize at what a tremendous pace Toronto has grown in the last few years; and if we suddenly find that we have outgrown our proportions and have to consider afresh the scope of our city, that I think is very natural and we need not spend time in deploring a mis-spent past. It occurs to me to say this because I have just spent three days at Ottawa listening to some very excellent speeches, some most instructive addresses, largely about the sins of Canada in wasting her forests in the past and as to what we are to do in the future; and it seems to me that deploring the past is after all a waste of time. The question now is whether Toronto has reached the point where it should consider its surroundings and its future, and whether it has the courage and intelligence to do those things which every one of us know ought to be done. (Hear hear.) Now we have 300,000 people—so the Directory says, and if it is not quite true, it is approximately true. One of the enterprising journals of Toronto recently started what is called “The 500,000 Club.” I believe most of the business people in Toronto believe it is quite practicable to give an impetus to this city which shall cause it to have 500,000 people a great deal earlier than it would have without this impetus. If we do not believe this, then we are not like the the rest of the people in the western world. In the

United States cities are often made by the efforts of 15 or 20 leading men. A small percentage of the people believe intensely in their city, their patriotism showing itself in an intense love of that particular part of the earth, and these men make it what it is.

The question that devolves upon the people of Toronto is, whether they believe in this scheme; not as a pleasant after-dinner diversion; not as a thing, which gentlemen who may be too enthusiastic have taken the trouble to develop into a coherent plan; but as something which the people of Toronto will take hold of and commit themselves to as a programme for the future, taking all the necessary steps by legislation, or otherwise, to ensure that this is the plan which Toronto proposes to follow for the next 15, 20, 30, 40, or 50 years, and authorizing, as far as they can, that money, in a natural way and so as not to be too great a burden, shall be spent year after year, in order to bring about its completion.

We need not deceive ourselves by imagining that if we go away from here to-night, and the Architects and all those who have been concerned in it have been thanked for their love of our city and the energy and intelligence they have displayed in the development of the plan, and we have got the assurance of the Mayor and others that in a general way all believe in it and hope to see it worked out—we need not imagine that any great result is going to flow from that alone. We are not going to have any result unless this plan, or something akin to it, takes the form of concrete legislation. This plan has been developed by the careful study of skilful men and is as perfect and intelligent as these gentlemen know how to make it. Doubtless, however, it has faults and may be altered to advantage in some respects, but let us say that a plan evolved by a little alteration of this should be accepted and confirmed by legislation, or otherwise, as the plan which Toronto proposes to follow in developing these important roadways and in developing its parks. (Applause.) When that has been done; when such a plan has with its consent been imposed by the Province upon the city of Toronto, at I hope the urgent request of the present Mayor and of the gentlemen who are around him; when we have all said as citizens—both as individual citizens and as we are represented in the Council—that this is what we propose to do; then I should like to see of this city—as there is in the Library at Washington, of that city—a plan modelled on a comparatively large scale and put in some public building of Toronto, so that every man who comes to Toronto may go and see it and realize what we are going to be 10 or 20 years from now. (Applause.)

When you think of people like the Americans, so impetuous and so ambitious that one can hardly imagine them projecting anything that will take more than a year to accomplish—when you think of a people like that, having a plan which will take a hundred years to carry out, at an expenditure of \$2,000,000 a year—when we realize as some of us can, as anyone who saw Washington 20 or 30 years ago can, that absolutely desolate mud-hole and sand flat on the banks of the Potomac, and consider what they have already done and what they believe they can do, not by natural advantages but by forcing beauty out of most unnatural situations—what kind of people are we in Toronto if we think we have not something serious to do? It would be absolutely

unnatural if at this stage of the history of Toronto we had not something very serious to do. The real point is, not that we have it to do but at this moment when we are touching 300,000, when we have had a most extraordinary growth, when the people of Montreal are wondering if Toronto is going to wrest the supremacy of trade from them, wondering why the people of the west deal more at Toronto than in Montreal, when we see this, are we, the people of Toronto, ready to seize the advantage which is ours at the particular moment, and surround our city with forms of beauty and convenience, with just those things which every man would like to have about himself and which we as an aggregate of citizens must desire to have about ourselves? Are you going to attempt these things, not regarding them as dreams for the future, but as the absolutely essential things for a self-respecting city which has a care for the health of its people, for the easy transportation of its citizens, things which cause people to desire to come and live here—because men who sneer at architects still somehow choose places to live in that happen to be beautiful, somehow or other they have that much sense? (Applause).—Are we then as citizens going to take the steps, the serious steps which will involve making all the leading men interested in Toronto—men like Mr. Hays, who was here yesterday, (I talked to him about this plan and he was quite interested in it,) the officials of the C. P. R., Mr. Mackenzie, the Toronto Street Railway, every interest there is in Toronto—make all these people firmly impressed with the fact that it is necessary to make this a city that it is good to live in. Are we going to make them all feel this so much that we will take this plan, or something developed from this plan, and make it a law for the people of Toronto which no new Council can change—they would have to go to the Legislative Assembly to change it. And then shall we say that we are ready to spend the money necessary to carry it out?

Now let us consider what the spending of the money means. The President spoke about me as being interested in the artistic side, but I fancy it was intended that I should speak about the financial side. When the new Government in Ontario came in, I was one of those who had charge of seeing whether we could get some money for new buildings for the University of Toronto. We needed half a million dollars, and the very prudent treasurer had said to Mr. Whitney that he did not know where they could readily find half a million dollars. This difficulty was pointed out to us and I was the one who was to present the financial situation to the Premier. I said to the Premier, that in Ontario we always talk about giving cash subsidies to railways of \$3,200 a mile, but we never give any cash, we give annuities for 30 years based upon 3-1/2 per cent. and issued in such a way that the railway can sell them to get \$3,200 or thereabouts for them. Why not help the University in the same way? \$30,000 for a term of thirty years will give us all the money we want. Mr. Whitney had only to hear this and it was done. Now, if the city of Toronto by legislation through Parliament, levies a tax rate for a particular purpose and which must be levied every year, it can realize relatively an enormous amount of present money against this, without a very heavy tax rate in any one year. I believe the income from a great deal of property, which the city owns and which

is not necessary for civic purposes, belongs to the Parks and Gardens Committee. However that may be, we might spend apart from this, say, \$100,000 a year. If \$100,000 is so raised each year, and if no incoming Council can divert this particular item, it becomes part of the uncontrollable expenditure, and we can do an enormous amount with such a power of taxation as that. Now if we raise that money and spend it, not in accordance with the particular view of any particular council—and this is not said in criticism of what any particular council has done or may do, it is said in criticism of the system which causes a new set of men to be elected every year who may not have ideas consistent with those of previous councils—but if we can have another set of men so organized that a coherent idea will run through that body, and if this money is spent in accordance with a plan which has been approved by the Legislative Assembly, we can in 10 years do so much that I am convinced our people would be impatient to see the rest of the plan carried out. (Applause). If such a plan were made law, and a model of it erected in the City Hall or somewhere else for people to see—I should also like to see it printed in colours in every directory published in Toronto and in every other form in which the map of the city is published, so that the people will have before them always the problem which they are trying to accomplish—and if we are hewing to that every year, we shall soon see that the people of Toronto will be behind us in a most uncomfortable way to get the plan pushed ahead and finished.

Now I lived in New York not very many years after Central Park was created, and very few people lived above the lower part of Central park. I am unfortunately old enough to remember hearing New Yorkers deplore the folly of building Central Park; how absurd it was to take a lot of swamp and rocks and muck-heaps and turn them into a park, miles in advance of settlement. And I have seen the City of New York applying to the Legislature for power to buy park lands which were not in the area of New York at all, which were miles above the then boundary line; because they knew what the requirements of the city would be and if they waited until such land was in the city limits and then sought to buy, the problem would have become almost impossible. Now you can start at Central Park and drive miles through parks and these have all been created in the last 20 or 30 years, and many have been bought when they could be bought by the acre. I mention this because the Mayor seemed to think there would be some difficulty in buying, for instance, the banks of the Humber. But if Ontario is the same as elsewhere in the matter of Municipal Government, there would be no difficulty in our getting power to buy land beyond the boundaries of the city. So far as the city is concerned we can remember the time when it was perhaps a third of its present size, and the general impression most people had of Toronto was that it was an unusually uninteresting place. It was not exactly flat, but a flat slope. Now that it has grown larger and by means of street cars we can reach the Humber and the Don and the Rosedale valleys, we realize that it is not by nature an ugly place at all, but that it is by nature a very beautiful place. We realize also that much of the land around Toronto is of no use for agricultural purposes and that there surely never

could have been a city anywhere that has so much land at both ends and at the back as well, suited for no other purpose than for waste places. It is a pleasant idea, "waste places", a beautiful idea, because it after all means tracts of land that men cannot cultivate and which have to be left comparatively in a state of nature for the benefit of man. Let anyone go out to the beautiful Lambton golf links and see what has been done there with great ease. We can have with as little expense as any city of the same size, a wonderful investment of parks. We know to a certainty that every year we postpone the purchase of any such land we shall have added to its value just exactly what the steady outgrowth of the city of Toronto towards the land means; and if there is land one mile from a settled part of Toronto, which can be bought at a certain price, if we wait five years we shall have to pay the extra price which is represented by five years of the growth of the city towards that land. The common sense of any man who thinks for a moment shows him that some day the city will want these parks, and if we can get money in any way to secure them, we should buy them now and not wait until the real estate vendor or the process of expropriation causes us to pay enormously as compared with what we should have to pay at the present time. (Hear hear.) To me, gentlemen, it is not a question of the city beautiful, it is just a question of practical common sense. Do we really believe in the city of Toronto; do we believe it is going to be one of the great cities of North America? Do we believe that beautiful surroundings, fine roads for driving, fine highways, to let your people get in and out, will pay? One of the serious troubles of modern cities is the incoming of the people from where they live and the exit at night—we have to go out now in zigzag fashion and we know full well we cannot continue to do that, we must have radials to take the people out, and shall we begin to buy these radials now or at a time when they will cost 5 or 10 times as much as now? And let us consider that if this were done in such a manner as Sir Henry Pellatt suggested, by means of a commission, the purchase of these radials might be managed in such a way as to cost very little. A part of that scheme involves the widening of York street. Could not any five gentlemen in this room, if they had the power to buy the land on both sides of York street up to Osgoode Hall or obtain it by expropriation, effect the widening of it so many feet on each side and sell the new frontages so as to make money out of doing it? It is clearly possible to take the land on York street, buy it, dismantle the houses, widen the street, sell new business sites and make money. When you build the radials you could not do that throughout, but if a commission bought every block that would be intersected by the radials, and controlled the rebuilding on their blocks, do you think we have not men in this city who, if empowered by a proper commission and put in such a position that their ideas could not be changed every time a new Council came in, would not for the love of it, manage business like that and do it without the cost being at all a serious matter. My idea is that what seems the most expensive part of that plan would be the least expensive if managed in a business way. (Applause). Without trying to say what it is going to cost, do you mean to tell me that the 300,000 people in Toronto at the present time,

among the most liberal spenders of money in America, cannot afford to buy such surroundings in parks and boulevards as other cities in North America have? And can they not afford it much more than cities in Europe? In Europe it is true that labor is cheaper than here, but all the improvements are so much more solid and lasting than ours that the money they have to spend is out of all proportion to the money we spend.

My last word to the gentlemen here—or rather to the people of Toronto, who I hope will hear of this meeting—is that this is not a difficult question practically, this is not a difficult question financially; it is really a question of whether the people of Toronto at the present time are going to join the movement which is taking place all over Canada—there is a larger movement in railway building, in banking, in the distribution of goods, a larger feeling from one end of the country to the other—whether the people of Toronto have got into this movement and into this larger wave of action enough to do the thing for their own city, which is not only eminently reasonable but is to the last degree necessary.

PLUMBING AND SANITATION.*

Forty odd years daily experience in the theory, and practice of modern plumbing—I use the word in the broad sense of its meaning as generally understood by the public (covering the allied trades of heating, roofing, etc.)—and a consequent intimate contact and association, with the architect, his client, and the general public warrant me in making the statement, that there is nothing that so quickly makes and assures the architect's reputation as good plumbing—and nothing so rapidly, surely and often unjustly, mars his reputation as faults in connection with this important and complicated branch of the building trade. Let the foundations be laid never so well—the facade, be architecturally correct, the interior plan be faultless, decorations unique and artistic—all is quickly forgotten, should drains choke, roof or water pipes leak or the heating apparatus fail in giving the desired temperature. The proprietor forgets the mason, carpenter, artist, plumber and only remembers his architect, when such troubles arise. True the plumber comes in for a certain amount of the blame, and hard talk—but as a rule, he has at least a certain amount of justification, and a ready excuse is afforded him when he can say "I followed out your architect's plans and specifications," and if he has done so, does not his responsibility outside of the workmanship end there? At least I know that in many cases he thinks it does. And he the plumber ever so much in fault the proprietor still blames the architect for his want of knowledge in employing an unskillful or characterless man.

Such being the case, the question arises how you are to minimize the risks you run in such matters, for the best of pipes will leak, drains will choke, fixtures overflow, and through no fault of either plan or practice.

Consider for a moment what the plumbing apparatus in a modern dwelling is. In even a small and unpretentious house, it is a most complicated and intricate collection of material that have to be assembled in a skillful manner and according to highly scientific

*A paper by Mr. J. W. Hughes, Montreal, read before the Sketch Club of the Province of Quebec Association of Architects.

principles, if the desired results are to be attained, and, once completed, it receives little or no thought or care on the part of the owner or user; such as a similarly complicated and expensive apparatus would receive daily if it formed part of the plant of a manufacturing concern. No one even thinks of seeing that moveable parts, from time to time, are oiled; that lost motion is taken up; that nothing is done with, or to it, except what is legitimate, and according to the intention and purpose for which it was designed, and constructed. It is only when something goes wrong that, in the vast majority of cases, the plumbing apparatus receives a thought; and then it is looked upon as an outrage and robbery that something has to be done and money spent. Great pressures are constantly at work day and night, year in, and year out, trying with varying force to tear it apart; expansion and contraction from varying temperatures is always at work to break it; in our climate the cold never fails to get in deadly work, when the slightest opportunity is afforded it; added to all this, is a carelessness on the part of the users that you would scarcely credit. Is it any wonder that troubles are frequent? The wonder is rather that there is so little to complain of.

There is a further complicating factor in the difficult problem we are considering and that is a the constant change that is going on. During my time men, methods, and materials have changed completely, and more than once. In the early days of the trade in this city, all soil, waste, and water pipes, were of lead; sewers were constructed of brick or wood; there were only "the pan closet," and "the hopper" and "trough"; sinks were of stone, wood or lead lined, "sewer gas" was unknown; back venting and soil pipe ventilating were unknown quantities. The discovery of the germ theory of disease, and the necessity of guarding our dwellings against the entrance of the disease-producing little microbes, completely revolutionized the old fashioned plumbing methods. To-day iron has almost entirely replaced lead, as a material for soil and waste pipes; the modern porcelain closet has replaced "the pan"; the same material has largely replaced the sinks and baths of our fathers; and brass and copper, as well as iron, have largely taken the place of lead for water pipes. And the end is not yet, for they are hard at work, experimenting with a view to the introduction of glass, as a material for the conveyance of the water and sewage of our dwellings, and when success is attained, as I have no doubt it will be, we will have an ideal material for the purpose—and present indications are that it will be "made in Germany."

My intention in the foregoing remarks was to fully impress you, if possible, with the importance of the subject we are considering, and to bring as forcibly as possibly to your understanding the difficult and complicated problem offered for solution. Did I go no further you might consider the time so far devoted to the subject as wasted; but there is no intention of wasting your valuable time, and it will be my endeavour to now present for your consideration something practical and useful for at least a partial cure for some of the ills we mutually suffer—as in this matter the architect and plumber, are as completely joined as were the celebrated "Siamese twins," and any attempt at severance of the connection would in all probability be attended with serious, if not fatal results to one or both.

The first factor to be considered in the solution of the problem, from your point of view, is the plan. At the risk of being considered presumptuous, permit me to say a few words, from a practical man's point of view, of this important part of the subject. First, you must attend to the sanitary features of the case; plan for health. You are building dwellings, homes, for rich and poor; places of life, light and enjoyment. The first, the greatest requirement of a dwelling is that it be healthy; honestly built, on healthy site, amidst healthy surroundings. You can not control all the conditions; the site is not yours in the choosing; the surroundings are beyond your power: but your knowledge and skill must be such, as to attain the best possible results from the conditions you have to deal with. If the site is damp, or boggy, or subject to occasional flood, you must plan for not only sub-soil but also surface drainage. Water in itself is one of God's good elements; it is only when it is "matter out of place", that it becomes a menace to life and health. No one dreams of considering the water of the river, lake or ocean, a danger to those residing in its vicinity; we naturally go to the water in the heated summer term, for health; but the undrained swamp, the stagnant pool, the damp cellar and moulded walls, are dangerous to a degree; and no one can have them as neighbours or harbour them in the dwelling without sooner or later paying the penalty imposed by nature for a violation of its laws.

The removal of sub-soil water presents many difficulties; but in our city there should be no trouble, provided you establish the principle of never erecting your buildings at such a level, as to be below the sewers made and provided by the city for sewerage and drainage purposes.

Such a remark may seem unnecessary and uncalled for, but I know that it is done every day. I could name a number of buildings that are periodically flooded because the cellars are either below or too near the level of the city sewers. There must always be a margin of safety. The crown of the street sewer, with an allowance for proper fall, should be your starting point. I know the owner will fight and argue against steps, to business blocks, and insist on a cellar of given depth; but let me assure you that, when the water rises in the cellars and so renders them useless, or goods, are damaged, he forgets all your arguments against going too deep in the ground, and the fact that he insisted upon having things as they are, is no longer in his mind; but he does not forget to talk of the foolishness of the man who built him a useless basement, and the stupidity or worse of the plumber who carried out the plan. If necessary, I could mention a number of cases in point. Of course artificial means of drainage may be employed in certain cases; and, where large plants are installed in charge of skilled men, such means may safely be adopted; but outside of this, for the ordinary shop or dwelling, there is only one safe plan, and that is to so construct your building that the natural drainage will always be available. In planning for the erection of buildings on low and swampy sites, provide for a system of sub-soil drains so laid that they may easily and safely discharge the sub-soil water into the existing sewers; taking care that they be properly trapped at their junction with the main sewer; and further taking care that, during the dry seasons, these traps are supplied with water enough to keep them safely sealed against the entrance of air from the sewers. This is

best done by connecting the waste from some convenient fixture, so that water will always be supplied to the trap. A wash basin or sink, to be used for clean water only, is the best; as the use of a W.C. or Kitchen Sink will likely result in the choking of the trap and consequent filling of the sub-soil drains with grease or sewage, or a special pipe can be run, from which water is allowed to drip. Cellular gutter land tiles are very good for sub-soil drains provided they are not laid in running sand. If unfortunately your building rests on such poor material, I know of no form of open drains that will not fill up. In such case the sinking of a pit, with an outlet at the proper height, with the usual precautions against its filling with sand, is perhaps the best method of procedure; but great care must be taken to prevent the sand running into the drains, if you wish the building to stand erect. I know of one large building in this city the front of which nearly came down, owing to the fact that a leaky water pipe, near the foundation, washed the sand away into an open drain in the vicinity.

Next, as to the sewers, or those pipes that are to carry off the liquid wastes of the building; as distinguished from the drains, which are for the conveyance of sub-soil, or surface water. They must be of extra heavy cast iron pipe inside the building, as called for by the civic by-law, and should, when at all possible, be so arranged as to be at all times above the floors; or, failing this, at every change of direction fit a cleaning eye that will permit of the insertion of a cleaning rod, from point to point and out into the main sewer. I know of no better material for outside drains than properly laid tile pipes, and no worse material for the inside pipes, especially if they have to be laid under ground, as to make them tight they must be thoroughly cemented at the joints. This makes them into a long and continuous length of very brittle material, sure to be broken by the slightest subsidence of the ground or building, and even by the use of the building. The handling of heavy goods in a warehouse, or even certain legitimate acts in a dwelling, are enough to cause sufficient jar to break these pipes.

Avoid too large pipes, try to plan your sewers so that the amount of water flowing through them will scour or flush them. Remember that the largest flush pipe from an ordinary closet is only 4 in.; and that, as a rule does not deliver the water in a solid stream but it is usually broken up by the fan or spreader in the closet basin. A pail of water, rapidly emptied into a W. C., is generally the maximum amount of water discharged into house fixtures at once. Of course when roof water is discharged into the sewers through the house pipes a large flush will be the result at times, when heavy rain falls occur; but it is very seldom that the ordinary roof of a dwelling will flood a 4" pipe, even if running full at the inlet. The friction and resistance as it travels through the pipe, reduces it in volume. Many architects plan to increase the size of the pipes according to the number of the fixtures to be discharged into them. While this plan has some merit, be careful not carry it too far. Remember that if there were a dozen closets on one pipe, and the greatest care was taken to have them all discharge at the same moment, that it would be impossible to so arrange them in ordinary practice, that the discharge from all of them would reach the main soil pipe or drain at the same moment; and that the water reaching the main stack first, can

never be overtaken by that which follows it. My experience is that more trouble has occurred by the filling up of drains and sewers that were too large to be properly scoured, than by the blocking of small drains that are fully flushed. The same remarks apply to the waste pipes. It is quite common to find 2" pipes called for from wash basins, and baths, whereas the average bath and basin plug will not allow sufficient water to pass to fully flush an 1½" pipe.

Carry your pipes direct as possible. This can generally be done with very few bends and offsets, if provision is made at the proper time in the stone, brick and woodwork; but when bends have to be provided, at every flat, on account of the variation of thickness of walls, or because beams have been put in the way, or the roof outlet is at an inconvenient point, you have a needless complication making for trouble. While nothing is planned for the reception and passage of pipes, the positions of the fixtures are indicated; but the work of other trades may render it an exceedingly difficult matter for the plumber to get his pipes to the positions without doing a lot of damage that could be easily avoided were provisions made at the proper time. Shew on your plans, embody in your specifications, the necessary instructions to carpenter and mason. The pipes large and small are as necessary a part of the modern building, as the doors and windows—then why not provide for them.

Plan to have the fixtures where the sunlight will get to them. Remember light is the great life giving agent, and that all plumbing fixtures are of necessity more or less foul. Let the light shine on them; the sunlight, if you want them to be clean and kept clean. Treat the plumbing as an important part of the building; don't treat it as something to be put in any dark hole or corner, where you can put nothing else. Have a dark parlour if you please; it is most used at night when artificial light will dispel the gloom and make it nice and inviting; but have the bathrooms light; the sinks, basins and tubs near the windows.

If you wish to avoid trouble concentrate the work—try to place the fixtures so that an accidental overflow or burst will not damage the hall or parlour ceiling. The less the pipes are scattered about the less will be the first cost, and certainly there will be the least amount of trouble, in the future care and maintenance of them. Where it is necessary to have fixtures in different parts of the building, plan to have them as nearly as possible one over the other; it may in some cases mar the artistic effects, but it won't damage the ceilings and walls so much, in case of the inevitable flood.

Have every part of the plumbing fixtures easily accessible. When possible run pipes in back passages and through pantries and such rooms and leave them exposed. Where they must be concealed, have this done by some means that will allow the pipes to be quickly exposed. Hooks and buttons are best; screws are a nuisance, their taking out is sure to cause damage to decorations and paints. Never put pipes behind fixed columns, or plaster them in, as the day will surely come when they will require some attention; then trouble begins, and reputations are wrecked with the ceilings and walls.

Select simple fixtures. A closet with a complicated system of valves, levers, syphons and overflows, may work perfectly when new, but is sure sooner or later to

get out of order. A single seat is better than one with a cover, which is a survival of the old style boxed in W.C. The cover is a complication that serves no useful purpose. A W.C. is a W.C. and if there is anything in it that requires to be covered, there is something wrong. Have it so arranged that it is impossible to cover up any filth or foul matter. Basins with the plain old fashioned plug, are the best. Those with a complicated system of recesses, stand pipes, and valves, are to be avoided; they get out of order, and when in order the parts are not accessible, and so get foul and malodorous. The same remarks apply to baths and sinks. As to traps there is nothing to equal the **S** or half **S**, or **P** trap. The traps of a complicated form, such as are in common use, have not a proper scour, and are never clean. The merit claimed for them is that they are non-syphonable, which is open to question. If they are so, it is because they obstruct the rapid flow of water. Syphonage can best be prevented by a proper system of back venting; and even this can be carried to an excess, and often is. I have in mind a house where all the traps are back vented with long lines of pipes, of the sizes of the traps, but with unavoidable twists and turns, that render them inoperative, and their fitting was simply a waste of money. Venting traps in a basement, with long lines of pipes carried up in walls through the house to the roof, is not good plumbing—although at first thought it may seem so. This is where that uncommon commodity, common sense, comes in. The risk of danger from a syphoned trap is far less than the risk incurred by the getting out of order of long lines of concealed vent pipes. Fortunately the average water cock, is seldom perfectly tight; they all drip a little and this drip is enough to reseal in a few minutes a trap deprived of its seal by syphonage. Do not for a moment suppose I am advocating the running of any risk of danger from emptied traps; what I desire to impress upon you, is that there is risk of overdoing the trap venting part of a plant, as well as of incurring needless cost. "Simplicity thou art a jewel" would be a good motto for the architect and plumber to have constantly in mind, when planning.

While on the matter of sewers—it may not be out of place to say we have not got a really first-class joint for iron pipes. The lead joint is not to be depended upon, as, from its nature and the difference in properties between it and the iron, the lead is sure to work loose. The really permanent part of the ordinary caulked joint is the oakum. When proper oakum is used and it is thoroughly caulked, it forms a safe material against any serious leakage of sewer air; the lead holding it in place. It has been my practice for years to put a substantial covering of putty on top of the lead while it is hot, as an additional safe guard. The best joint I know of is made of red lead and oakum. This makes a permanently tight joint, with sufficient elasticity in it to allow for the slight difference in size of ordinary pipes, arising from the various changes of temperature; but it is so filthy to handle that it is unsuitable for general use in house work. Portland cement and oakum also makes an excellent and durable joint. The difficulty with it is the fact that workmen cannot be depended upon, in general practice, to take proper care in mixing the cement; and you have to depend upon the workman, after all is said and done, as you cannot be on hand all the time to watch the various details of a complicated practice

The introduction of wrought iron pipe, with the ordinary screw joints, has much to recommend it, but there is as yet unsolved the question of durability*. If the gases and fluids of the sewers attack and destroy a material possessing so great a resistance to such forces as lead and cast iron, it can hardly be expected that so susceptible a material as wrought iron or steel would be permanent. The introducers of this system, evidently appreciating this fact, claim to cover their pipes with some resisting material; but the coating is of necessity so thin as to not be worth the cost of its application. The pipes are thick and no doubt last many years, but there is nothing like cast iron. Speaking of coating pipes, permit me to say that the so called asphaltting should be omitted; in fact in some towns the plumbing by-laws expressly forbid the use of coated pipe. In Montreal it is so now. The coating at the best is so thin as to be of very little practical use, but it suffices to cover defects. Many a length of pipe has gone into use that, were it not for the coating covering its defects, would never have left the foundry. You cannot see blow holes, cold shuts and similar defects, when covered with a coat of black varnish or tar—politely called asphalt.

Have all pipes that serve as main stacks carried full size through the roof. Omit the intercepting trap; there must be no interception of sewage. Once it leaves the fixture, the quicker it reaches the end of its journey (the main sewer) the better. The basic principal of the water carriage system which we use is the rapid removal of solid and liquid sewage matter from the premises by means of an adequate amount of water, and any checking of this is defeating the very object, desired to be obtained. Too much stress has been laid by "faddists" upon the danger of sewer gas getting into the house from the main sewers. Gentlemen, there is no such thing as sewer gas; at least so far the scientific world has not been able to find it. Sewer air there certainly is; that is the ordinary air, loaded with the odours of decaying animal and vegetable matter; but the main sewers are all ventilated into our streets and from our streets we get the air of our houses, we cannot get it anywhere else in the city. Take no chances of the sewer air getting into the house from defects in workmanship or materials of the interior plumbing; but trying to bottle it up, and in so doing obstructing the flow of sewage in the pipes, is not the correct way of doing it.

Water-pipes are in general practice made of lead. An excellent material it is for water pipes when it is pure lead, and years ago there was no thought of seeking a better; but of late years so much argentiferous lead (a by product of the silver mines) has been put upon the market that the old "stand by" has lost its character. Pure lead is soft and pliable; the argentiferous lead is hard and brittle and liable to crack and leak. Especially is this the case when it is used for the conveyance or circulation of hot water. Many substitutes have been introduced. Plain iron pipe is apt to rust out in a few years. Galvanized iron has been extensively used of late. Whether the very thin coating of zinc with which it is covered, is an ample protection, time alone will tell, and it is a question whether the inside of the pipe is thoroughly coated. Judging from the experience with galvanized iron

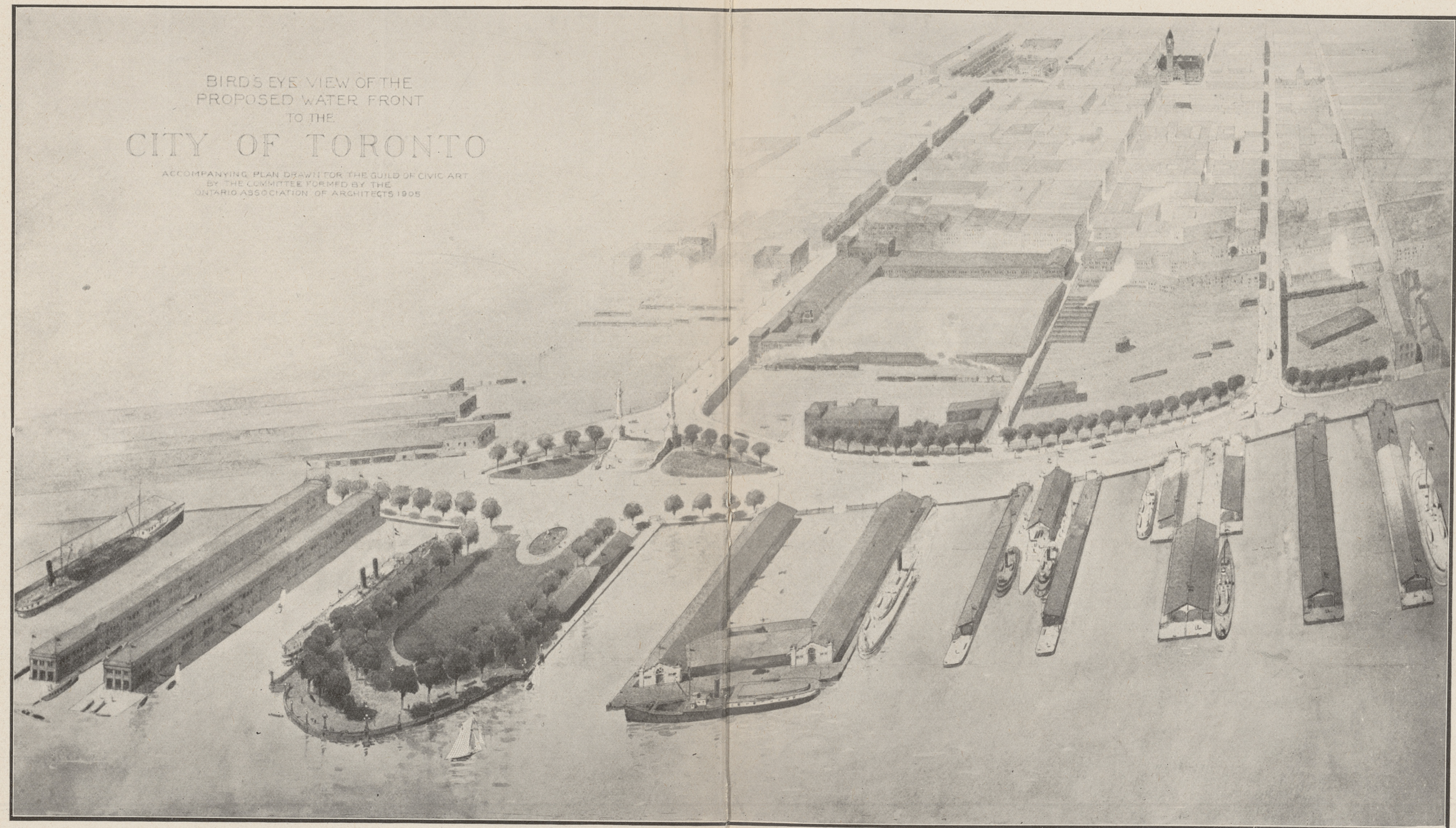
*Since this was written I learn they are trying to pull them out in New York because of corrosion.

range boilers in this city, it is a most unsuitable material that will soon give trouble; and from a sanitary point the contact of water with zinc is very undesirable. Glass lined iron pipe has also been introduced in this city, and one would suppose it was an ideal material for the purpose; but I have had to remove it from one row of houses, as for some reason, probably the difference in the expansive qualities of the two materials, the glass after a few years began to break up, and it was no uncommon thing to draw broken glass from the taps. On the removal, and up ending of the pipes in question, small particles of glass would come out in quantity. Tin lined iron and lead pipes have also been tried, the difficulty with the tin lined lead pipe being that, in making the joints, the low melting point of the tin caused it to run and made trouble; besides it was expensive. I have here a sample of lead lined iron pipe. It looks all right and combines the durability of the lead, with the strength of the iron. At the moment I know nothing against it but it doubtless has its weak point, probably the joint. The difficulty with all combined materials is the unequal expansion and contraction and in some cases galvanic action is set up, that rapidly destroys the material. Taking it all in all, there is nothing better than honest lead pipe for the conveyance of cold water; and copper pipes—iron pipe size, not thin copper pipe, such as I have shown you—for the hot water system. The samples of copper pipe show plainly the effects of both galvanic action and the unequal expansion and contraction between the copper and the solder of which the joints were made. These samples were taken from a house on which no expense was spared in the fitting of the plumbing; and, while the pipes did good service for a long time, in the end damaged ceilings much worry and expense were caused by their use, and they had to come out.

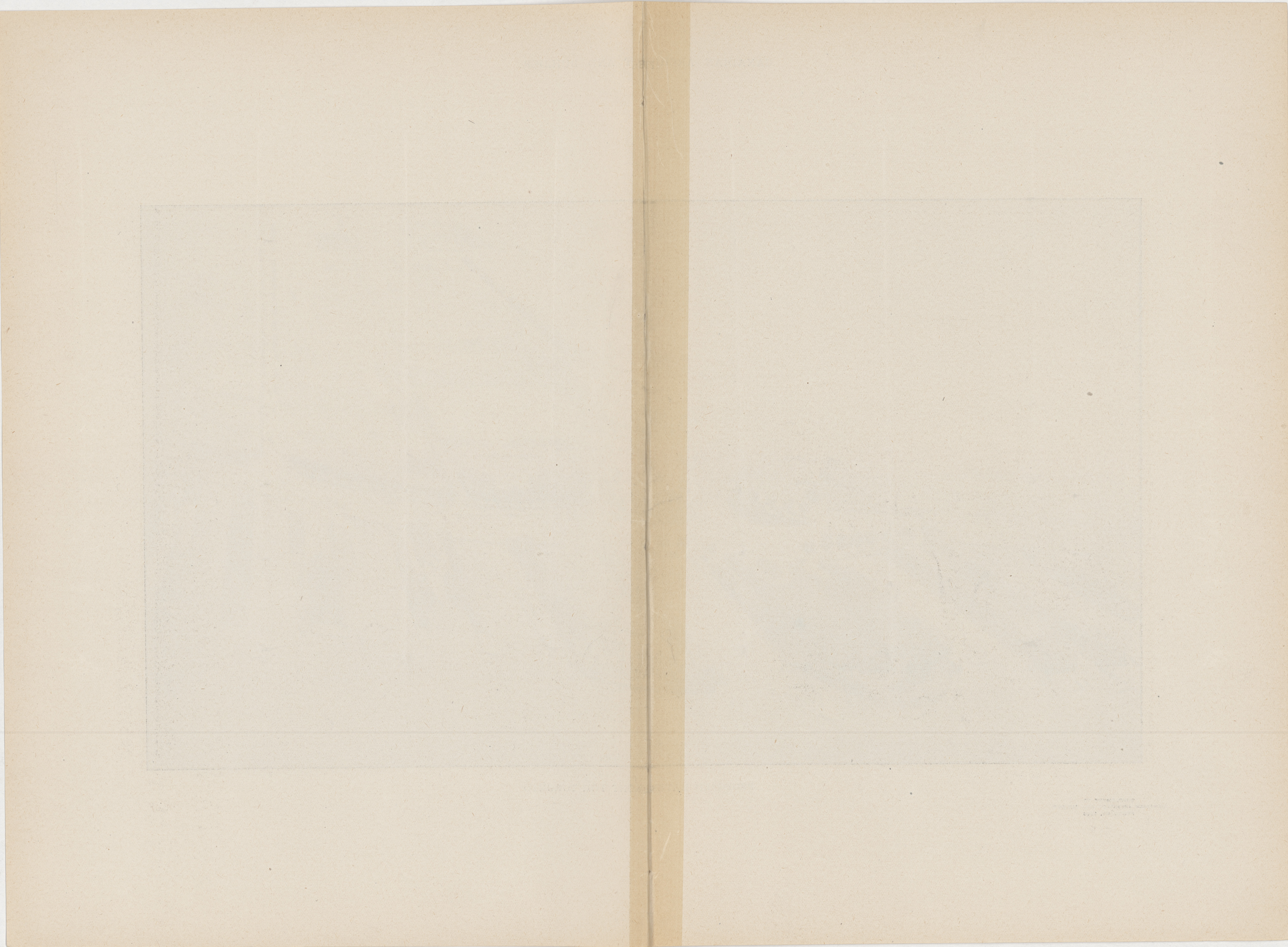
The question of ventilation is too large and important a one for me to take up at this time; but a few words on the heating apparatus will not be out of place. While the modern low pressure steam plant is doubtless the best for some buildings, our Canadian experience so far is that nothing can come up to the modern low pressure hot water apparatus, for ordinary domestic purposes. And here let me say that this form of apparatus had its origin in our city; and in no other city that I am aware of, are the dwellings of the people so generally and comfortably warmed. In fact the demands of our people in this respect approach the unreasonable—that 70° should be demanded in sleeping apartments, with a 20 below zero temperature outside, is going beyond reason, besides being exceedingly unhealthy. Imagine sleeping in an apartment at 70°, and stepping out in the morning, at say 25 below zero. The wonder is that our people do not suffer more from throat and lung troubles than they do. Permit me to remark that there never has been a temperature of 30° below zero in Montreal, as far as I have been able to find out. Once, a year or two ago, it went to 26° below. That is I believe as cold as any authentic record we have for our city proper. Yet some specifications call for 70° when the thermometer is 30° below.

I will now tell you the whole secret of having a warm house. There is no other way of getting it in our climate and I want you to keep it constantly in mind. It is to build it warm. No furnace, boiler, stove or other means of supplying artificial heat is

sufficient to counteract all the cold of out of doors; and that is what is being attempted when the house is constructed in such a manner as to let in the cold. Honestly built walls of proper thickness, with the joints filled with mortar, not merely jointed outside to look well, are indispensable. Then, no matter how thick these walls are, or how solidly they are built, there must be an air space between them and the inside plaster. This air space must contain confined air, for if the air can circulate behind the plaster, you have a perfect cooling apparatus; in fact it is on this very principle of moving; air that refrigerators are built; but confined air is a good non conductor and protection against cold. A solid wall that is plastered on the inside, or even lined with porous bricks, will not keep out the cold. It cost me several hundred dollars to find the latter out, but you can have the benefit of my experience for nothing. The walls should be back plastered between the furring, carrying the coating of plaster well up, and down, between beams; and the furring must be stopped off at the top to prevent the circulation of air. Then door and window frames must be cemented into position tightly with oakum. Stuffing material around them that looks like chopped straw or dried grass, lightly pushed in with a screw driver, as I have seen it done dozens of times, is not caulking in the frames with oakum. The object to be attained is to keep out the cold; and, if you let it in around door and window frames in ever so small quantities it gets behind your inch of plaster, and, instead of having solid walls between your house and the outer cold, you have only the thickness of plaster. If the air behind the plaster can circulate as fast as it becomes heated, it moves off to be replaced by a fresh supply of air from out of doors. The door entrances to buildings are another weak spot. In the course of construction the stone and brick beam, filling gets knocked away. The mason has gone, "Mr. Carpenter" lays his floors, sets up his steps, builds the gallery; and there openings are left; invisible but getting in their work of letting in the cold; and the house dwellers wonder why the floors and walls are so cold, and why there are draughts; and "paterfamilias" curses the architect, the furnace man, and coal dealer, because of the size of his coal bill; wonders why "Jones" heats his house with 10 tons of coal, while he with a smaller house is never warm, and burns 15 tons. The reason is "Jones" is heating his house and his neighbour is trying to heat all out of doors—a big contract in our climate. Another weak spot, a very weak spot; of comparatively recent origin, is the ventilated roof. It is right to ventilate the roof, but, when you let the outer air in below the roof, remember you must keep it from entering the house. A one inch rough board and a thickness of building paper is not proper construction for our winter; and hundreds of our houses are so constructed. I could give you many instances of this if necessary, I know of two first class houses where a few bags of sawdust, put on top of the boards in the attic space, made all the difference between a warm and comfortable house and a cold and uncomfortable one; and the unkindness of it was that I had to supply the sawdust and labour because I was so unfortunate as to have fitted a furnace in these houses. Sawdust is not a proper material for the purpose, but you must have something to keep out the cold. Mineral wool is a better material.

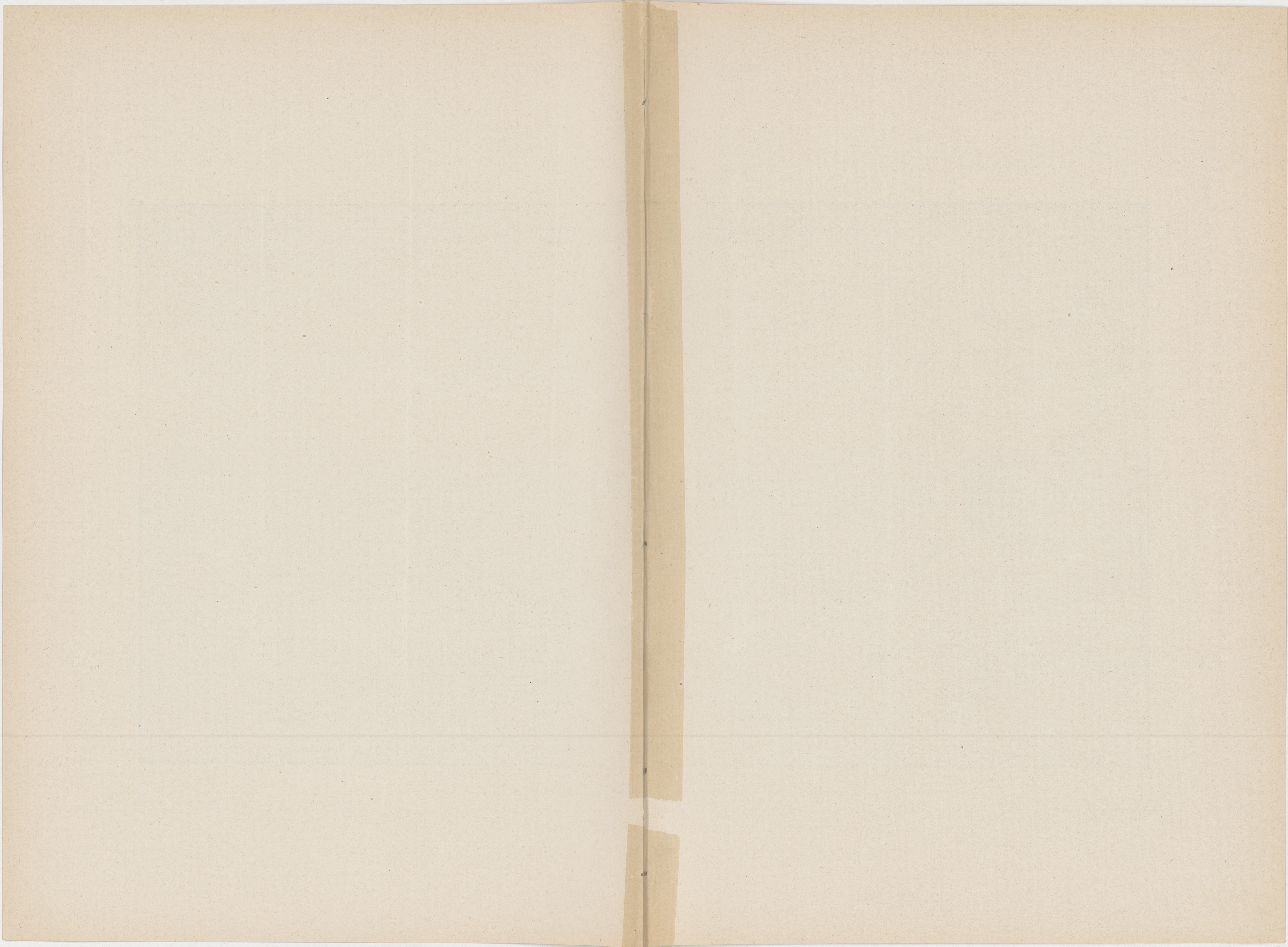


PROPOSED WATER FRONT FOR TORONTO





PLAN OF IMPROVEMENTS TO TORONTO.



Gallery beams projecting through the walls are another source of trouble. The mortar dries around them and the cold pours in just where it will do most harm. Caulk them in tight with oakum if you want the house warm. You will be told they are well bedded. They may be; but timbers when wet with mortar swell, and when dried by heat shrink; and the air enters. You must remember that when the air is cold outside and warm in, there is a very considerable difference in pressure; and the cold air is seeking entrance by every crack, cranny and pore. It is possible to blow out a candle through 1' 0" thick of sandstone, and ordinary brick and mortar is much more porous. Keep out the cold by taking the proper common sense precautions at the time the building is being constructed; it cannot be effectually done afterwards; and you will have a warm house, small coal bills, contented clients, possibilities of ventilation, and a good reputation. As to percentages of piping; years ago we never thought of using over 6% on the ground floor, 5% on the first floor, 4% on the third floor; but your modern building is cold with 10%, 8%, 7%. Why? Simply because the same precautions are not taken keeping out the cold as were taken in the older buildings.

I have one request to make, as a matter of simple justice to your heating contractors; that is, do not put in a blanket clause in your specifications, that puts the plumber at the mercy of an unjust and unreasonable client for the balance of his life. Plan your house, specify what you want in the way of heating apparatus, and see you get it; then, instead of running off with a clause that the building is to be heated to a given degree in coldest weather, say: "If the proprietor, after a season's trial, desires additional power or heating surface, the contractor shall be bound to supply the same at contract rates. This is perfectly fair to all but the heating contractor, as he cannot go to a finished apparatus and add to it except at a greater cost than the original work. But he will not object to this I am sure; while the present practice is unfair and unjust to a degree. Imagine my having to put additional radiators, for nothing, in a room that had been occupied for 5 years as a bedroom and was then converted into a sitting room; and imagine further any architect, calling himself an honest man and a gentleman, backing up such a claim. That it was not necessary was proved by the fact that, when a year after the additional heating was done, the house changed hands, the next tenant had the pipes taken out, because the room was too hot. Of course there was a cranky woman in the first case.

I must now touch upon a somewhat delicate subject, but it is the most important of all the subjects we have had under consideration. Something has been said about selection of materials and methods to be pursued in their use; but the most important selection you have to make, for your own sake—and the sake of your clients, is *the man*. The best is none too good. Don't let the continued cry for cheapness influence you. Your reputation you cannot afford to cheapen; and every time you let a contract, you put your reputation into the hands of the man you let it to. You cannot watch him all the time; and if he wants watching you have no use for him. None of us can be in two places at the same time, and while you are in your office—or even in your bed—the skin contractor may be wreck-

ing your character. Beware of the man who is always telling you how good a job he is making for you; who is always at the building to point out his good work, and the mistakes the other fellow is making. "Good wine needs no bush." Try to select men who have some character as well as skill and means to put into their work. Beware of the cheap man.

Tenders will of course vary within a reasonable limit; but when some one is away down look carefully into the matter. No one gives a dollar for ninety cents. There is no necessity for so doing, the dollar is always worth a hundred cents. If a man says he is doing it, he is either a knave or a fool; and you cannot for a moment leave your reputation in the hands of such a man. If he is really giving you a dollar for ninety cents he is a fool; and not carrying out legitimate business principles. If he is only pretending to do it, he is a knave, and as honest men you have no use for him. Experience will teach you, that as a rule things in this world are worth what they cost. A cheap man or a cheap house, or a cheap architect is cheap because there is something lacking. Of course, the special cases and exceptions come in; and in the hurry of tendering, especially under some of the conditions that I am sorry to say exist, it is very easy for a contractor to make a mistake and "leave the roof off" as the saying is. In such a case it is far better to consult over the matter, and allow a man to withdraw. Do not allow him to amend his tender; that would not be just to his competitors, but you can allow him to drop out. Otherwise when, he finds out, as he surely will, that he has made, a mistake, the temptation to try and make up his loss, will be very great; and we are all human. When you have proved your men, trust them, they will take care of your reputation for you, if they find you are careful of them. It is their interest to do so; and, after all is said and done, self interest is the most powerful factor in all business matters. As a rule men do not become philanthropic until they have made their pile.

Another point is that in some so far as I know unaccountable way a man's personality and character gets into his work. Take two artists trained in the same school. One takes a canvas, stretches it, applies his colours; result, a painting worth fifty thousand dollars. His confrère, using the same materials and having the same training and desire, produces a picture that would be dear at fifty dollars. The training is the same the materials alike; the difference is in the mental equipment, the personality, the character. If you want Smith's architecture you cannot by any possibility get it from Jones, although Jones may agree to give it to you. It is the same with grosser materials. A friend of mine whom I congratulated upon having built himself a fine residence, said "yes, I am satisfied with everything but the woodwork; the carpentering does not come up to my expectations." I replied, "you have good woodwork, your carpenter is a good man and certainly did his best." "Yes," he replied, "that is so, but Johnston's carpenter work was what I was to have had." "But Johnston did not do the work," was my reply. "Oh," he said, "but Johnston's work was to have been the standard." When I told him that only Johnston in the whole world could give him Johnston's work, he paused a moment, then said, "you are right. It never occurred to me before. I engaged the wrong man."

INTERCOMMUNICATION.

[Communications sent to this department must be addressed to the editor with the name and address of the sender attached not necessarily for publication. The editor does not hold himself responsible for the expressions or opinions of correspondents, but will, nevertheless, endeavor to secure correct replies to queries sent in. We do not guarantee answers to all queries neither do we undertake to answer questions in issue following their appearance.]

A "Subscriber" writes: Could you inform me through the columns of the ARCHITECT & BUILDER as to whether it is possible to get a uniform color to a Portland cement, trowel-finished piece of work, such, for instance, as a dado for bathroom, kitchen, etc. I have to confess to the present time my inability to do it, and I have never yet seen any that has been uniform all through.

ANS.—Some of the most experienced and skilful plasterers state that, while they can get a perfect finish, they have failed to secure uniformity of color, and they do not think that a uniform color can be obtained.

From "Winnipeg": Will you please inform me which is the more economical, heating by steam or by hot-water. Also please state what about radiating surface would be necessary to heat up a large room to 60 degrees when the mercury is freezing point outside? Any information will oblige.

ANS.—The condition and the efficacy of the boiler cause one method of heating to be more economical than the other; but speaking generally, the two methods are about equal in the heat afforded for the fuel consumed. If the fuel has, say 10,000 heat units to the pound, then the customary proportion of these units should be delivered from the radiating surface as well with steam as with hot water; but, as stated, the local conditions have always to be considered. The area of steam-heated surface to afford given results is usually six-tenths of that allowed with hot water; thus, 15 square feet of surface is a common average allowance per 1,000 cubic feet of space to afford 60 degrees where it is freezing outside, with hot water, while 9 square feet is allowed with low-pressure steam (11b).

From "Country Painter": Isn't there some method of fixing paints or stains with water or milk that will stand the weather fairly well? I am in want of such a water paint or wash that is cheap durable.

ANS.—Some years ago the United States Government had a formula for a cheap water paint that was used on the outside of light-houses and which seemed to stand fairly well. To prepare it, one-half bushel of lime is slacked with boiling water, and kept covered during the slacking to retain the steam. When cold it is strained-through an ordinary sieve or paint strainer and then one peck of salt, dissolved in warm water, three pounds of rice flour stirred in water and boiled to a thin paste, one pound spanish whiting and one pound pale glue dissolved in water, added to the strained lime mixture, thoroughly stirred and allowed to stand, well covered, for several days before using. This wash must be warmed in a kettle before using and applied with wall brushes as hot as it can be done without injuring the bristles. Such a paint wears well on wood, brick or stone. If a buff tint is desired, French ochre, ground dry, may be used as a coloring, and if reddish tone is desired, Venetian red should be used. A reddish buff is obtained by a combination of

ochre and Venetian Red. Chrome yellow should not be used, since this pigment is affected by lime.

A red wash can be made by mixing dry Venetian red, to which whiting or quicklime is added, with skimmed milk. The addition of half a gallon of linseed oil to each gallon of this wash will render it waterproof, but even without the oil it will stand for years.

In 1879 the New York *Evening Post* published three formulae for paints or washes, made up chiefly from lime or cement and skimmed milk. A very large class of water paints for outside use are made and sold to-day, and answer the purpose of cheap weather resisting paints very well indeed, that are dependent for their binding properties upon a product of this same skimmed milk-casein. Such paints dry with practically no gloss, and when dry, a second coat of paint can be applied the same as with any other paint. These casein paints are generally known to the trade as water paints, or alabastine. They are useful for all sorts of outbuildings, for painting brick walls and especially for the interior of factories, warehouses and sheds. While they cannot be said to be weatherproof, they will stand considerable exposure to the weather, and on old weatherbeaten woodwork may be used as a priming under an oil paint, provided the very best results are not looked for.

Still another class of water paints have been long extensively sold in England, and are to some extent sold in this country. These are put up in paste form, the same as ordinary oil paints, and require thinning with water to reduce them to working consistency. They depend upon silicate of soda or water glass as the binding agent. These paints have given good satisfaction wherever used, especially on brickwork, but are more expensive than the casein paints and hence have not come into such general use.

From "Workman":—How can I "Lay out" a circular top head for a window having parallel jambs, set in a circular wall?

ANS.—This is a problem that generally puzzles the young workman, but a little study of the subject soon convinces the operator that the solution is not so difficult as at first supposed. Let A in Fig. 1 represent

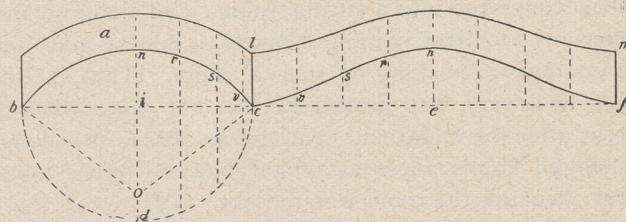


FIG. 1.

the plan, which is drawn from the centre O. With a radius equal to half the opening draw the semi-circle b d c, and lay off the quadrant c d into any number of equal parts. From these divisions erect vertical lines to the outside of the wall plan, and upon the extended horizontal line, from c to e, place these verticals at the same intervals as the divisions of the quadrant, and make the points n r s v the same height in the development, and a curve traced through them will show the concave edge of the soffit, while the curve traced through the ends of the verticals will give the convex edge. That part from c to f is found in the same manner, being merely a repetition of the first half.

Straight wood may be left on each end for the purpose of securing the head to the pulley style or jamb, and if the circle of the head is not very large, the soffit should be made of two or more laminations and glued together on a form the same shape as the head of the opening, in this case, a semi-circle.

Fig. 2. shows a more complicated operation, and illustrates the laying out of the head casing for the concave or inside of the circle top frame in a circular wall.

Here I have used the same plan as before with the result that the casings at o o are twisted out of correspondence with the drawing, however, this does not prevent their fitting the wall if correctly made.

After laying off the wall plan, draw a horizontal line any distance above it, and with a centre, i on this line, describe the semi-circle casing as it would appear for a straight wall. Divide this into any number of equal parts, the same as in Fig. 1. and drop vertical lines through the wall plan to the corresponding points on the concave side as shown at 1, 2, 3, 4. Below the

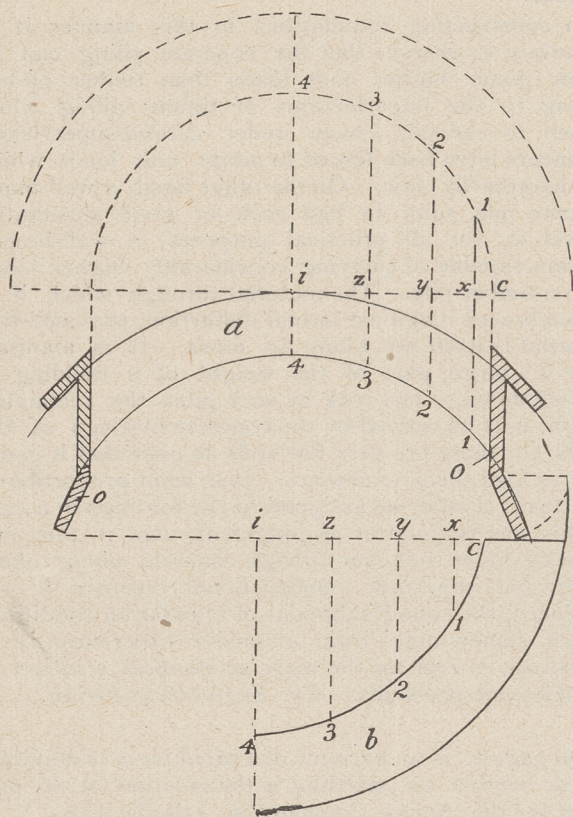


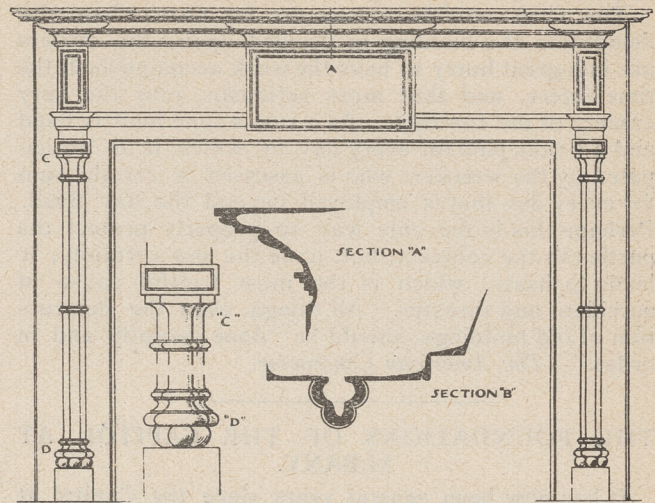
FIG. 2.

wall plan draw another horizontal line of any convenient length, and upon this set off the distances found at 1, 2, 3, 4, on the wall plan, and which are marked X, Y, Z, I. From points just named drop verticals equal to and correspondent with the distances found in the quadrant in the upper part of the figure, and through the ends of these trace the line c 1, 2, 3, 4. This edge may be sawed out and the other side gaged from the first.

The reason for this operation is that the real width of the opening to be covered by the casing is shown at o 4 on the wall plan, and must be incorporated with the proper height and curvature which is accomplished in the pattern b.

From "Builder":—Will you kindly publish a sketch of a colonial mantel suited for a bed-room finished in colonial style and enameled in flat white?

ANS.—We reproduce herewith a design for a mantel



COLONIAL MANTEL FOR BED-ROOM.

which we think will be appropriate. Some details are shown which may prove useful to "Builder."

WRECKING BUILDINGS.

It is only within comparatively few years that the business of wrecking buildings has grown to large proportions in this country. Until recently old buildings were shored up, repaired, remodeled and made to continue in service. Now the rule is reversed and many structures that cost a large sum of money and are still well adapted to discharge the duties for which they were constructed are being torn down and replaced by others, many of which in their time, and a short time in frequent instances, will follow their predecessors to the junk yard.

The wrecking of buildings has now become a well-defined business, in the prosecution of which a great deal of capital and large numbers of men are employed. The business is at once useful and lucrative. A large amount of material, nearly all of which is valuable and much of which can be employed in other buildings, is recovered, while contracts are made on a basis insuring large profits to the skillful and well equipped wrecker. For these reasons, coupled with the fact that the field is large and constantly widening, wrecking companies ought to be able to tear down buildings with as great safety as they are constructed.

This does not seem to be the case. The demolition of the Chicago court house, which has been but a short time under way, has already resulted in the loss of two lives and the serious injury of several men. While nothing in the way of reflection upon the contracting concern is intended, it seems proper to call attention to the circumstance that better modes and closer supervision of such work may be secured, not only in the present instance, but throughout the country at large, since the present instance is by no means an isolated one. So serious were the Chicago catastrophies that the city authorities ordered work on the structure to be discontinued until greater precaution against accidents could be provided.

The wrecking of buildings is a distinct business in itself, depending on different conditions and principles than those that control in construction undertakings. The theory seems to have been quite generally adopted that while it takes the highest skill to build, properly and safely, any sort of labor is good enough to tear down. This idea should be dispelled, and that once for all. The profits of wreckers are sufficiently liberal to justify the employment by them of skilled labor and the use of the best appliances and machinery, not only now produced, but that ingenuity can devise and scientific workmanship construct. The business of wrecking buildings ought to be safeguarded, and that in every direction, quite as much as is that of construction, and these latest accidents, following hard on

others that have preceded them, should have the effect of producing more stringent regulations.

The chief trouble seems to be that when the demolition of a building is decided upon, the owners are in a great hurry to have the work accomplished, the time enters, and that most seriously, into the very essence of the contract. As a rule a time limit is fixed and a bonus paid for every day by which it is anticipated by the wrecker, who is assessed a certain sum for every day that is employed beyond the day fixed. Perhaps this is the only way to properly protect the parties to the contract, but, none the less certainly, it leads to haste, which is the most fruitful cause of accident and disaster. All things, even the destruction of old buildings, should be "done decently and in order."—*The American Contractor*.

THE FOUNDATIONS OF THE CAPITOL AT ALBANY.

It has now been several years since the Capitol at Albany attracted attention save as the centre of legislative wisdom of the Empire State, but it has at last emerged from its placid condition of apparent security to resume its previous rôle of a structural nightmare. After sinking about \$25,000,000 in this building the taxpayers of New York might be warranted in hoping that it was at last completed and fit for occupation for all time, but this expectation has been rudely crushed by recent events. It has been necessary to close the monumental stairway leading up from State Street to the portion of the building reserved mainly for the Assembly. Just what has happened to the building is kept a secret by the authorities, but experienced engineers have made an examination which is said to indicate that some movement of the foundations has thrown such heavy loads on a part of the masonry as to subject it to danger of crushing. It is unfortunate that this has happened at the Assembly end of the building, for, coming after the notorious trouble with the ceiling of the Assembly chamber, the masonry of which has been replaced by papier maché in order to reduce the loads on the walls and piers, it may be thought that this branch of the Legislature is forever condemned to transact business under a sword of Damocles.

The staircase has been the source of considerable trouble in the past, and extensive repairs to it were executed about eighteen years ago. Evidently these were not adequate, however, and if the present authorities are able to do so they should secure an appropriation from the Legislature which will enable a competent engineering commission to make a thorough examination of the building. Mr. Edward P. North, M. Am. Soc. C.E., makes the following comment on the conditions, which indicates how necessary such an examination is: "The difficulty with the Capitol is that it is founded on blue clay, which is without support toward the east. The result is that the clay is fluid under the weight of the building." He adds the further comment that piers carried down to bed rock will prevent the settlement or movement. Anybody who has had any experience in trying to keep heavy buildings in place on a sloping mass of clay will not need to be told that trouble will follow weighting such material if it is free to move sideways. A large structure for manufacturing purposes on the Hudson not far south of Albany has shown a tendency toward extensive travels from this cause, while the trouble in Cincinnati and Cleveland in keeping buildings in place on a mass of unconfined clay is well known. Some important structures in the former city have been giving much trouble lately on account of sliding material under their footings, while the difficulty experienced by the railways along the water front in Cleveland was shown in a number of illustrations printed in this journal a couple of years ago.

As a preliminary step, absolutely essential to the satisfactory solution of the Capitol difficulties, a

thorough examination must be made of the materials underlying the building. This must show the slope of the bedrock and the thickness and character of every stratum above it. A thin streak of water-bearing sand below a mass of clay may cause all manner of trouble, yet its location may be difficult to detect. Such an examination will cost considerable money, yet if it is not appropriated the legislators may bring down on their heads many tons of hard and heavy masonry, in addition to the severe criticisms of their constituents.

Until very recently the problem of building foundations on clay was frequently solved with a considerable reliance on Providence as a part of the factor of stability which entered into the design. Buildings were erected on clay which was known to rest on water-bearing sand or gravel, because the expense of carrying down deep concrete foundations to the bed rock was very great. Timber piling could not be used in most of these cases because it would be above the water level and was sure to decay in a short time. The only other method of going down to bed rock was by concrete piers put in by means of wells or caissons. More recently, however, the relatively simple concrete pile has come into use and seems to solve such foundation problems in a rational and inexpensive manner.

In constructing foundations in this manner it is important to observe that the concrete piling can be given much higher unit loads than timber piling. Owing to the imperfections of timber piling when driven to refusal, except under careful supervision, engineers have been forced to adopt unit loads which are necessarily low. On the other hand, a well-made concrete pile sunk to bed rock or good substantial gravel is, for all practical purposes, a well-braced column capable of carrying considerably higher loads than a timber pile. The material through which it is driven braces it against lateral distortion, provided this material is itself not likely to move. It is manifest that if a large part of the weight of a building is carried down to bed rock by such piles the remaining weight may be carried by the concrete footings of the walls, for there are very few soils so poor that it is not safe to load them somewhat. Just what proportion of the load should be assigned to the footings in a case of this sort is a matter of judgment, and it thus becomes evident that even though concrete piling offers a new and important constructional resource to the engineer, the sound judgment of foundation conditions which comes only from extensive experience is as necessary as ever for the most economical solution of troublesome problems.—*The Engineering Record*.

On page ix. is an account of a rapid piece of building. Work almost as startling is the erection of the new hotel for the Annex Company at Atlantic City, N.J., by the National Fire Proofing Company. This is a six storey hotel, containing 250 rooms, extending back from the Boardwalk 425 feet, of a width varying from 50 to 125 feet which, between June 17th and November 1st, was completely constructed and handed over to the owners ready for decoration and furnishing. The *modus operandi* of all quick work of this kind is that of the builder who built the workshop. All work must be carried forward at the same time. Although it sounds a greater feat to build a fireproof building in a short time, this manner of building, which completes the skeleton as a first stage, lends itself particularly to carrying forward different kinds of work at the same time, as may be seen at the Traders Bank Building in Toronto where the plumbers and steamfitters are reaching the top storey along with the steel frame.

The idealist is the bravest man in the world. Ideals are the stars to which we have been advised to attach our cumbersome waggons. We talk commonplacely of tides. The tides are merely the efforts of the sea to reach its ideal, the moon. It never reaches it, to be sure, but it gets further away from its bed for the trying.

P. Q. A. A. ANNUAL MEETING.

The annual meeting of the Province of Quebec Association of Architects was held at the Chateau Frontenac Hotel, Quebec, on Thursday, 25th January. It had originally been the intention to have a banquet in the evening, following the business meeting, but as the funeral of the late Mr. Prefontaine was taking place that day, it was resolved that out of respect to the deceased minister the banquet should be postponed. The whole of the business was disposed of in the course of morning. Mr. John S. Archibald, President, was in the chair. After the reading and approval of the minutes of the last annual meeting the Secretary's Report of the year's work of the Association, printed copies of which were in the hands of members, was by resolution taken as read and was unanimously adopted without detailed discussion.

The report noticed the following proceedings of the Association and of the Council:

Lectures delivered during the year by A. E. Loignon, on Re-inforced Concrete; and by F. G. Todd, on City Park Systems. The addition to the Library of 3 vols. of Sturgis' Dictionary



MR. ALCIDE CHAUSSÉE,
President Province of Quebec Association of Architects.

of Architecture; 2 vols. "Histoire de l'architecture," by Auguste Choisy; 1 vol. "Heating and Ventilation," by R. C. Carpenter; 1 vol. "Concrete Plain and Re-inforced," by Taylor and Thompson; 1 vol. "Strength of Beams, Floors and Roofs," by F. E. Kidder; 1 vol. "Construction Details," by F. W. Chandler.

The formation of the Sketching Club of the P. Q. A. A. to (a) hold competitions in design; (b) meet to read papers and discuss professional subjects; (c) to measure old work; (d) to visit buildings in course of construction. These functions have been carried on during the past year.

The publication for the first time of the annual Proceedings of the Association.

The amendment of the Act of Incorporation so as to remove difficulty experienced in putting into operation the clauses of the 1898 amendments to the charter respecting the prosecution of persons practising illegally.

Proposed amendments to the Westmount building by-laws.

Efforts to procure amendment of the Association Tariff.

Efforts to obtain recognition for the Association Code of Competitions.

Dealings, (still in progress), with the City Council of Montreal, in the matter of having the building by-laws amended so that blue prints of plans, presented for permits to the building inspector, shall be filed and kept on record at the office of the Building Inspector and that all such plans must be signed by the architect or the owner.

A communication to the City Council about by-law No. 345

"Concerning the erection of buildings on Ontario street"; pointing out that the height of buildings to be erected on that street should be governed by measurement and not by the number of storeys as laid down in the by-law; which communication was followed by a meeting with the Fire & Light Committee, to whom the matter was referred, who agreed that the by-law should be amended accordingly, and who further resolved to report to Council that future amendments to the building by-laws be first submitted to the Fire & Light Committee and that the Province of Quebec Association of Architects be requested to send a deputation of three members to sit and act along with the Fire & Light Committee in consideration of such amendments.

Examinations held and the admission to practice of two successful candidates.

The Treasurer's Report which follows was then similarly adopted, Mr. Brown being congratulated on the great reduction that had been made in the subscriptions in arrear.

TREASURER'S REPORT.

RECEIPTS were:—Balance, \$1,044.32; subscriptions, \$1,350; students and examination fees, \$75; registration fees, \$125; rent of rooms, \$80; dinner, \$73.50; exhibition at Quebec, \$18; scholarship fund, \$200; interest, \$43.47. Total, \$3,009.29.

EXPENDITURES were:—Library fund, \$75; returned to Quebec section, \$60; rent of rooms including cleaning, \$390; salary of asst.-secretary, \$360; typewriting, \$25; stamps and sundries, \$33; lighting, \$18.38; taxes, \$18; insurance, \$24; expenses at Quebec re-amendments to charter, \$100; expenses for dinner, \$146.10; examination expenses, \$90; furniture, etc., and repairing bookshelves, \$160.83; printing, \$69.50; architectural papers, \$33.05; King's printer, 23.32; Quebec Gazette, \$5; Municipal Gazette, \$12; Bell Telephone, \$1.20; refund to student, \$3; collection on cheques, 75c; balance in bank, \$1,371.16. Total, \$3,009.29.

THE ASSETS are:—Furniture and office fittings, \$677.04; electric lantern, \$114.50; library, \$1,296.33; fees due 1904, \$30; ditto 1905, \$110. Total, \$2,227.87.

THE LIABILITIES are:—Scholarship fund, \$400.

THE LIBRARY ACCOUNT began the year with a balance of \$210.17; received in cash, \$75; expended on books, \$114.33; and has a balance remaining of \$170.84.

The Quebec Section of the Association reported a balance to their credit of \$262.92, and their report was adopted; Mr. D. R. Brown making the suggestion that it would be a good thing that the Quebec Section should spend more of their receipts on the purchase of books.

On the call for the discussion of general business, Mr. Jos. Venne rose to suggest that the Association should do more in recognition of those who had rendered distinguished service to the profession. It had been, he said, the intention to confer the honorary membership of the Association upon the late J. W. Hopkins, but that gentleman's death had prevented the fulfilment of the intention. When old men who had worked well for the profession retire from practice their connection with the Association drops. Mr. Venne considered it desirable that such members should be eligible as honorary members and that others still practising, but of special eminence and distinction, should likewise be recognised by an honorary membership. It was resolved to recommend the Council to frame a motion to give effect to this suggestion.

The Secretary then read a letter from the Architectural League of America calling attention to its approaching meeting in New York.

A letter was next read from the Secy. of the Royal Inst. of British Architects in regard to the Seventh International Congress of Architects to be held in London in July 1906. It was explained that the Council of the P. Q. A. A. had decided to ask this general meeting to appoint any member a delegate to this congress who was prepared to attend it, and further to appoint some one to be president of the delegation. This was agreed to and, on the motion of Mr. D. R. Brown seconded by Mr. J. P. Ouellet, Mr. Archibald was appointed President of the Province of Quebec Delegation.

On the motion of Mr. D. R. Brown the new Council were recommended to reconsider the method of electing officers and if necessary to prepare amendments to the by-laws accordingly.

Mr. Jos. Venne pointed out an anomaly in the present system whereby the President of the Association, when chosen from Quebec, might nevertheless

not be President of the Quebec Section. In Montreal in such event the Vice-President acted as President. Thus the actual President got no opportunity to preside at any meeting but the annual one.

Mr. Gardiner, seconded by Mr. Jos. Venne, moved that \$200 be transferred from the General Fund to the Library Fund for the purchase of books. The motion was carried.

The Secretary, Mr. Vanier, read a letter from a young man who had presented himself for the Preliminary examinations and had failed. He wrote to ask detailed particulars especially as to percentage of marks attained, etc. Mr. Vanier asked the meeting how far they considered it advisable to go into detail in these matters. The President said this was a question on which the Council would be glad to know the general feeling of the Association. The subject gave

pathised with in what opposing arguments demanded; he therefore moved to postpone the consideration of the matter to next general meeting, to which the Council should be asked to report. Mr. Ouellet seconded and the motion was carried.

Mr. J. P. Ouellet then brought forward the amendment to the charter, recommended in the report of the Quebec Section, in regard to graduates of Universities being required to pass the preliminary examinations in freehand and geometrical drawing. The recommendation was referred to Council.

ELECTION OF OFFICERS.

The results of the voting on the candidates for office were as follows: President, Alcide Chaussée, S.N.F., S.C.B., Montreal; 1st vice-president, R. P. Lemay, Quebec; 2nd vice-president, D. R. Brown, Montreal; secretary, J. E. Vanier, Montreal; treasurer, J. R.



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rise to considerable discussion. Mr. Venne was in favour of giving a certain amount of particulars. Messrs. Baillargé, Berlinguet and Lacroix were opposed to being too free in going into detail in such matters. Mr. J. P. Ouellet wished to move that the meeting approve the position taken up by the Board of Examiners in refusing to supply details; but it was pointed out that the Examiners had never assumed this attitude and the motion was withdrawn. Mr. J. H. Lebon was urgent for the supplying of full information. Mr. Lemay said he thought this was a case for further consideration. There was no unanimity of view, and he felt that there was much that he sym-

Gardiner, Montreal; council, Jos. Venne, Montreal; J. P. Ouellet, Quebec; P. E. Nobbs, A.R.I.B.A., Montreal; C. S. Burgess, A.R.I.B.A., Montreal; D. N. Macvicar, Montreal.

Mr. J. S. Archibald as retiring president is also member of Council. Messrs. A. R. Decary and C. Dufort were appointed auditors.

Mr. Archibald thanked the officers of the club for the support they had given him during his term of office and called on Mr. Chaussée to take the chair. Mr. Chaussée from the chair briefly thanked the Association for electing him president and the meeting was then adjourned.

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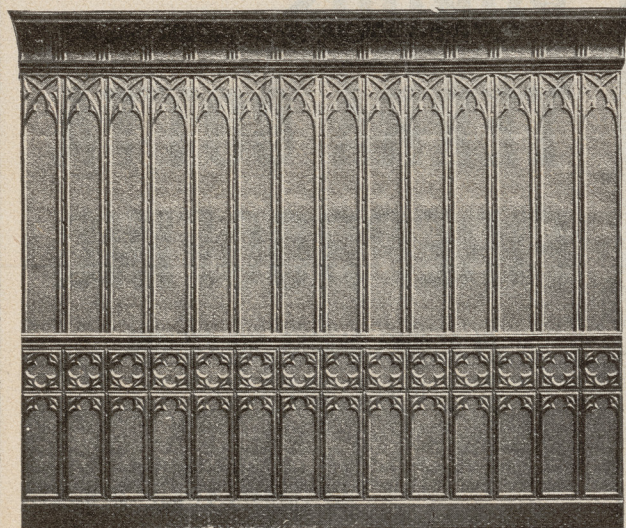
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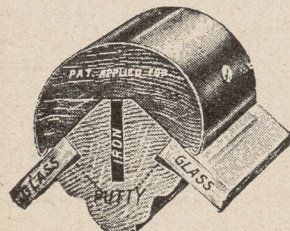
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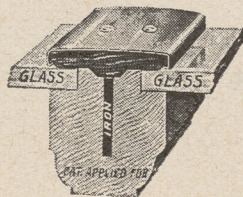
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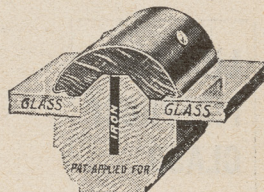
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THE MASTER PAINTER AS AN EDUCATOR OF ORIGINAL DECORATIONS. *

It is conceded that the decorators of a country are its instructors in art and decoration, although sometimes questions of finance may compel them to suggest and adopt a scheme of decoration which could not be considered of the highest artistic merit. In general, the people are beginning to realize that a little knowledge of decoration is quite as dangerous as a little knowledge of other things, and there is an effort to get away from the cheap and vulgar devices which have been distasteful and an eyesore so long, and to be guided in these matters by the decorator. This is very noticeable in our city where there is certainly a desire on the part of the public for something better in the matter of decorations.

The situation to-day requires on the part of the decorator a man bold enough to suggest the best treatment for the apartment he has in hand to decorate, not being afraid to ask a reasonable price for his work. A popular treatment from which results both pleasing and decorative can be obtained is the wall paper with a crown frieze, yet a large number of decorators object to them, giving as a reason that they cannot get a fair price for this class of work. I do not think this is the case, for I have found with very few exceptions the public is willing to pay the price when you can show them they are receiving value for the money expended.

The subject of adorning a house requires a special study of the various styles and colors so as to obtain a pleasing and appropriate harmony. The main aim of decorating and furnishing is the production of perfect repose. Such repose is produced by the mutual harmony in the decorating of walls and ceilings and whatever the room contains. Colour bears, perhaps, the largest part in the production of perfect repose in a room, and the decorator should keep in mind how essential it is that a proper colour treatment should be

used so that the room when completed will not be spoiled with colours that do not harmonize one with the other.

Getting down to the root of the subject we must admit that there are no laws of interior decoration, other than those of good taste, which must be intuitive to be appreciated. A true feeling for the artistic is a gift not in the possession of all, yet it is possible to give such suggestions and advice to the average man or woman in the way of selecting decorations so as to make the home pleasant and artistic also. The proper way to decorate a room is first to decide upon the design and general scheme of colour. The colours of an apartment should not be chosen arbitrarily, but with definite reason.

The following are a few of the general principles upon which colour schemes are founded and chosen: We will first consider light and size. The amount of light and size of the room are, perhaps, the chief factors in determining its color. In rooms facing the north, the north light, whitish to bluish in color, require to be decorated in luminous tints, ranging from orange yellow to warm red. On the other hand, rooms with a southern exposure should be decorated in tints ranging from greenish yellow to blue, because the south light has yellow and purple in it. Rooms facing east and west are most effective when decorated in yellow tones, as east and west lights have yellow and purple in them.

We will next consider the character of the room. The character of the rooms themselves often determines their colourings. For example, we may consider the various rooms of the house, beginning with the hall. This to the house bears the same relation as the trunk of a tree to its radiating branches. The hall, therefore, should be decorated in strong, dark colours; while the other rooms may range from strong tones for the library and dining-room to the lighter tints for bedrooms and dressing-rooms. Pompeian red, dull

* Paper read before the Toronto Master Painters' Association by W. J. Bolus.

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Yellows, russet browns and tans are suitable for hall decorations. In libraries rich hues are necessary, such as reds, browns, olive greens and deep blues. For dining-rooms the warm colours, such as soft reds, bright greens and browns are frequently used. Tapestry papers are also effective, especially some of the finer examples of fruit and scenic tapestries. The drawing-room and reception room are best decorated in light tints in shades of green, rose, ivory and yellow. In bedrooms and dressing-rooms self-tones of the softer shades are very appropriate. Floral designs on a white or cream background are also suitable, as they give an apartment a cheerful and inviting appearance.

We will next consider the woodwork as a guide. We have two rules to follow in this case; namely, to treat the walls in a self-harmony in the colour of the wood itself, or to use colours which contrast with the woodwork. In following the latter course it is very

important that the contrasts should not be of so violent a character as to be objectional. The amount of woodwork should also be considered, as a room with a lot of door and window frames will not stand as strong a colour contrast as a room in which the wall space largely predominates.

We must also consider the walls as a background for pictures. The colour that agrees best with all classes of pictures is a maroon red. For a room in which water colours only are to be hung, a sage green is the best. For oil paintings a bright red makes the best background; for engravings and etchings either green or red is very satisfactory. Rooms in which the walls are to be almost covered with pictures are best treated in plain colours, as a pattern is liable to detract from the pictures themselves.

There are many other things which could be considered, but I think the points I have touched upon are sufficient to open up the subject for discussion.

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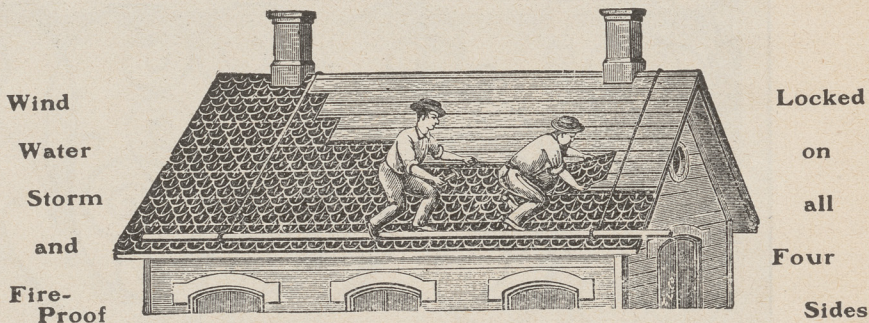
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WESTMINSTER PALACE.

The great Victoria Tower, said Mr. Philip J. Turner recently in a paper read before the Architectural Association, underwent various alterations. Originally designed a 100 ft. square, it has been reduced to 70 ft. The present fine arches, 53 ft. to the apex, replace an entrance of quite moderate dimensions. The numerous studies Mr. Barry made for this tower show that it must have caused him enormous trouble. The tower is 336 ft. high to the top of the pinnacles, and over 400 ft. to the top of the flagstaff. The flagstaff is of rolled sheet-iron, bolted together, and is 110 ft. long and 3 ft. in diameter at the base. The design of the Clock Tower must have given even more trouble, as drawing after drawing was made and rejected by the architect. The clock in this case had to be the prominent feature on the topmost story and of immense size, and the idea, carried out, of projecting the clock story beyond the body of the tower was at last adopted. The elevations, in a general way, have been criticized as being overloaded with ornament and small detail, but Sir Charles Barry's contention was that detail could not be excessive in amount if continued consistently in every part of a building. The whole palace covers a site of about 8 acres, the river front being 840 ft. in length. The House of Peers is a double cube, being 90 ft. long and 45 ft. high and broad; the House of Commons is 75 ft. long by 45 ft. wide; The work of the river wall was begun in 1837. An iron and brick construction was adopted in the floors: the roofs were constructed and roofed with galvanized iron, so that the entire building is of fire-resisting material.

The first stone was laid on April 27, 1840, and the works were rapidly proceeded with. Between 8,000 and 9,000 original drawings and models were prepared for the works, in the preparation of which Mr. Welby Pugin ably seconded Mr. Barry. The former was appointed superintendent of the woodcarving; he also supervised the execution of the woodwork, stained glass, and tiles. In February, 1847, the House of

Peers was occupied for the first time, and in 1852 the Royal approach was finished, and finally the towers, last of all being the Victoria Tower, incomplete at the architect's death in 1860. The original estimate was £707,104, the amount expended being nearly two millions. The main item in this increased cost was the cost of the fittings, decoration, and sculpture required by the Fine Arts Commission. The cost per foot cube is about 2s. 6d.

A NEW IDEA IN CONCRETE-STEEL CONSTRUCTION.

In the discussion on Steel-Concrete at the Toronto Engineers' Club, (January 25th,) it was reported that in experiments made at the testing laboratory of the School of Practical Science, steel, after being stretched beyond its elastic limit, was found to possess the property of taking unto itself another elastic limit beyond which it can be stretched; analogous, we presume, to the phenomenon of the series overlapping flow limits of ocean tides on the seashore. We understand this theory was accepted by prominent engineers present as a reliable scientific induction. And what is more important, the stretching of structural steel beyond its elastic limit prior to being embedded in concrete was actually recommended as good engineering practice. From what we can glean, the objective of this cold treatment of the steel is to equalize the stresses in the dissimilar materials. But what is the price to be paid for this equilibrium of forces? After the limit stretching, is the resilient structural steel, as such, as perfectly adapted for its purpose? We should hesitate to occupy rooms in a sky-scraper built in accordance with this academic drawn-wire theory. Awaiting with interest, formal statement of the case, we betake ourselves to a calm meditation on J. E. Stead's aphorism, which reads thus: "The result of careful experiment is the voice of Nature speaking truth, the interpretation of it is the work of fallible humanity.—*The Canadian Engineer.*"

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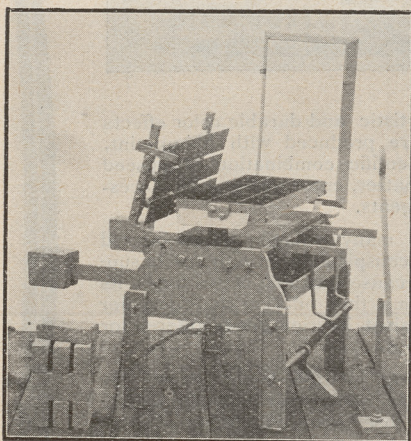
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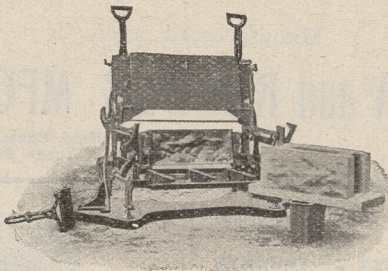
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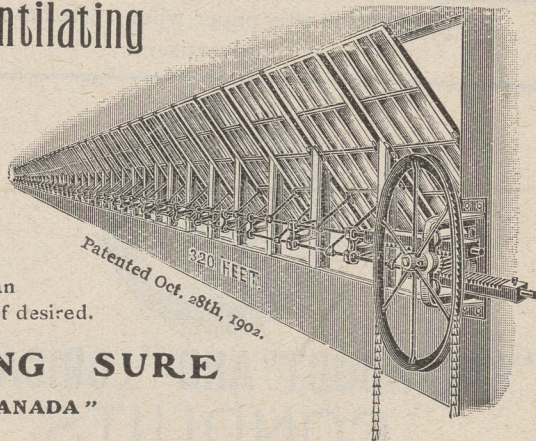
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Premier Whitney is considering a proposal, laid before him by the Toronto Guild of Civic Art, to have the interior walls of the Legislative Buildings in that city decorated by a number of historical paintings, and the Premier is said to be inclined favorably toward the idea.

Ontario is a well-to-do province and could afford to spend some money on providing, at a stroke, for the education of its people in popular art as well as the encouragement of local artists. How it is expected that Canadians will ever become accustomed to the good in art when they are seldom permitted to see any of it, is a mystery. We speak in envious terms of the art treasures of Europe and the artistic spirit of their people; but is it to be supposed that nothing is due to the public spirit which paid artists to decorate the walls of nearly every public building of importance and

of the similar interest of the church in art which turned many of the Middle Age chapels into marvellous galleries of paintings?

If Venice had never painted a Doges' palace or a church picture, would its matchless galaxy of painters have ever arisen to dazzle the world? If the Italian church and Roman and Florentine nobles had had no orders for the long line of artists who culminated in Raphael and Michael Angelo, are we quite sure that we would ever have heard of these sons of genius?

Canada will never produce a native school of either art or literature until she covets such a possession sufficiently to pay out some of her precious money for for it. If a series of good paintings can be put upon the walls of the Legislative Buildings in Toronto, they will have a lasting effect upon the artistic feeling and spirit of the next generation; and who knows what

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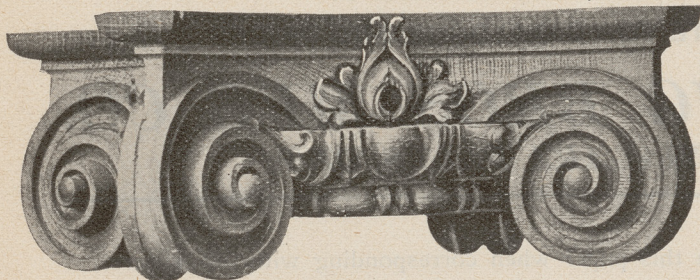
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It is imperative that the paintings be good; but, in an age like ours, this ought not to be difficult. We can afford to secure the advice of the best judgment. This will save us from the necessity of working out our own salvation, a task which so long clogged the feet of artistic development in the old pioneer lands of art. But a willingness to spend public money on the encouragement of the native school and a belief that a series of good pictures open to the people would be a profitable investment, would be lights shining on the path of progress.—*Montreal Star*.

CURING CONCRETE BLOCKS.

J. R. White, of Elnoruk, Neb., writes in *Municipal Engineering*, about a method of curing cement blocks, which is a cheap and practical way for the operation of small works. He says: We have made a practical use of it this summer and find it very satisfactory. We have racks built and covered with lumber four deep, two racks with a 4-foot alley between them with enough projections of roof to shade both sides. Each rack is wide enough for two tiers, so we use both

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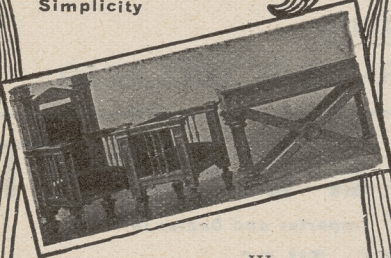
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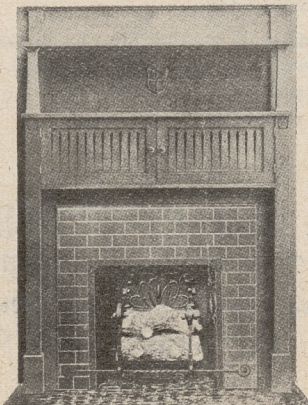
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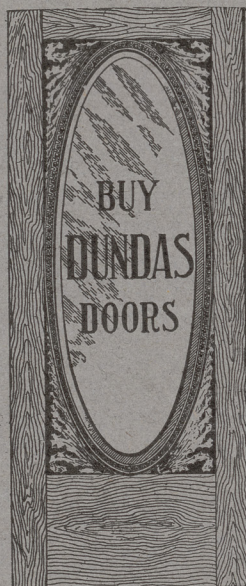
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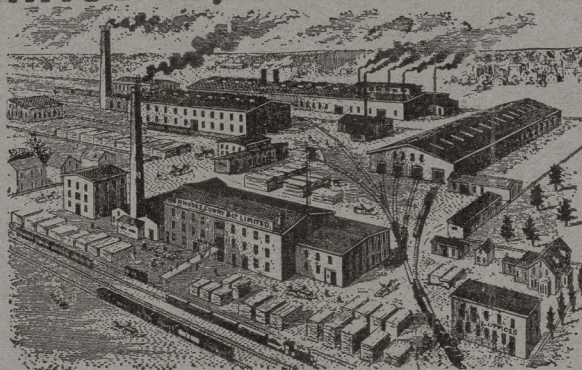
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